National Park Service
U.S. Department of the Interior

# State of the Park Report

## Kennesaw Mountain National Battlefield Park

**Georgia**

**November 2013**

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**On the cover:** Civil War cannon and field of flags at Kennesaw Mountain National Battlefield Park.

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Disclaimer. This State of the Park report summarizes the current condition of park resources, visitor experience, and park infrastructure as assessed by a combination of available factual information and the expert opinion and professional judgment of park staff and subject matter experts. The internet version of this report provides the associated workshop summary report and additional details and sources of information about the findings summarized in the report, including references, accounts on the origin and quality of the data, and the methods and analytic approaches used in data collection and assessments of condition. This report provides evaluations of status and trends based on interpretation by NPS scientists and managers of both quantitative and non-quantitative assessments and observations. Future condition ratings may differ from findings in this report as new data and knowledge become available. The park superintendent approved the publication of this report.

# Executive Summary

The mission of the National Park Service is to preserve unimpaired the natural and cultural resources and values of national parks for the enjoyment, education, and inspiration of this and future generations. NPS Management Policies (2006) state that "The Service will also strive to ensure that park resources and values are passed on to future generations in a condition that is as good as, or better than, the conditions that exist today." As part of the stewardship of national parks for the American people, the NPS has begun to develop State of the Park reports to assess the overall status and trends of each park's resources. The NPS will use this information to improve park priority setting and to synthesize and communicate complex park condition information to the public in a clear and simple way.

The purpose of this State of the Park report is to:

- Provide to visitors and the American public a snapshot of the status and trend in the condition of a park's priority resources and values;
- Summarize and communicate complex scientific, scholarly, and park operations factual information and expert opinion using non-technical language and a visual format;
- Highlight park stewardship activities and accomplishments to maintain or improve the State of the Park;
- Identify key issues and challenges facing the park to help inform park management planning.

Kennesaw Mountain National Battlefield Park encompasses approximately 2,923 acres of mostly hardwood forest that preserves a Civil War battleground of the Atlanta Campaign. Between June 19 and July 2, 1864, a series of battles occurred here between Gen. Joseph E. Johnston's Confederate force of 65,000 troops and Gen. William T. Sherman's Union army of 100,000 men. Eventually, Sherman's army outflanked the Confederate force and forced them to abandon their lines. The loss of Kennesaw Mountain removed one of the last major geographic obstacles protecting Atlanta, which eventually fell to the Union army in September of 1864. The fall of Atlanta bolstered the Union army's resolve to continue the conflict and eventually led to the re-election of Abraham Lincoln as president in 1864.

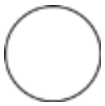
The purpose of Kennesaw Mountain National Battlefield Park is to preserve, protect, and interpret, for the benefit and inspiration of the people, the historical and natural features of this major battle site in the American Civil War's 1864 Atlanta Campaign.

Significance statements express why the park unit's resources and values are important enough to warrant national park unit designation. Kennesaw Mountain National Battlefield Park is significant because:

- It is the only nationally designated battle site that commemorates the 1864 Atlanta Campaign. Union victory in this campaign ensured the re-election of Abraham Lincoln and thereby the eventual preservation of the Union.
- Kennesaw Mountain National Battlefield Park preserves 8.9 miles of original Civil War field fortifications, which were decisive elements in later stages of the American Civil War.
- The Park is one of the best places to see a diverse community of migratory birds east of the Mississippi River. The park was the first designated Globally Important Bird Area in the state of Georgia and is a focus area for bird conservation in the Southern Piedmont of the United States.
- Kennesaw Mountain National Battlefield Park is the site of a major Civil War battle, which also provides one of the largest contiguous federally managed public green spaces in a major metropolitan area serving millions of recreationists each year.

The summary table, below, and the supporting information that follows, provides an overall assessment of the condition of priority resources and values at Kennesaw Mountain National Battlefield Park based on scientific and scholarly studies and expert opinion. The internet version of this report, available at http://www.nps.gov/stateoftheparks/kemo/, provides additional detail and sources of information about the resources summarized in this report, including references, accounts on the origin and quality of the data, and the methods and analytical approaches used in the assessments. Reference conditions that represent "healthy" ecosystem parameters, and regulatory standards (such as those related to air or water quality) provide the rationale to describe current resource status. In coming years, rapidly evolving information regarding climate change and associated effects will inform our goals for managing park resources, and may alter how we measure the trend in condition of park resources. Thus, reference conditions, regulatory standards, and/or our judgment about resource status or trend may evolve as the rate of climate change accelerates and we respond to novel conditions. In this context, the status and trends documented here provide a useful point-in-time baseline to inform our understanding of emerging change, as well as a synthesis to share as we build broader climate change response strategies with partners.

The Status and Trend symbols used in the summary table below and throughout this report are summarized in the following key. The background color represents the current condition status, the direction of the arrow summarizes the trend in condition, and the thickness of the outside line represents the degree of confidence in the assessment. In some cases, the arrow is omitted because data are not sufficient for calculating a trend (e.g., data from a one-time inventory or insufficient sample size).

| Condition Status | | Trend in Condition | | Confidence in Assessment | |
|---|---|---|---|---|---|
|  | Warrants Significant Concern |  | Condition is Improving |  | High |
|  | Warrants Moderate Concern |  | Condition is Unchanging |  | Medium |
|  | Resource is in Good Condition |  | Condition is Deteriorating |  | Low |

# State of the Park Summary Table

| Priority Resource or Value | Condition Status/Trend | Rationale |
|---|---|---|
| **Natural Resources** | | web ▸ |
| Air Quality |  | Estimated ozone, average visibility, and nitrogen and sulfur wet deposition levels in the park for 2005–2009 warrant significant concern based on NPS Air Resource Division benchmarks. |
| Geology and Soils |  | Soils in the park are mostly clay and sandy loam, with moderate to high erodibility. There is evidence of common, severe stream bank erosion, and common, high, and extremely rapid sedimentation in streams. Sediment cover is 60–80% in many stream locations. |
| Water Quantity and Quality |  | The magnitude and timing of flows in the park are typical of streams draining urbanized areas (e.g., flashy flows after rain events and low base flows). Stream temperate, pH, and dissolved oxygen measurements were better than the state standards for Georgia, but nitrate, phosphorus, aluminum, and fecal coliform bacteria levels all warrant significant concern. Stream health is Fair based on the Macroinvertebrate Index of Biological Integrity. |
| Flora and Fauna |  | The park has a high species richness and diversity of amphibians and birds, with 23 species of amphibians and 208 species of birds documented to occur in the park. Twelve invasive species identified by the Georgia Exotic Pest Plant Council as Category I (i.e., species that invade intact systems, displace native vegetation, and alter ecological processes) occur in the park, including Chinese privet, kudzu, and honeysuckle. |
| Dark Night Sky |  | The modeled Anthropogenic Light Ratio (ALR), a measure of light pollution calculated as the ratio of Average Anthropogenic Sky Glow to Average Natural Sky Luminance, was 19.67 which is considered of significant concern. The park is adjacent to the Atlanta metropolitan area with a population of 5.5 Million people and a 28% growth rate in the past decade. |

| Priority Resource or Value | Condition Status/Trend | Rationale |
|---|---|---|
| **Adjacent Land Cover and Use** |  | Between 1992 and 2006, the percent of lands surrounding the park that are classified as forest or wetlands decreased from 60% to 30%, whereas the percent of land classified as Low/High Intensity Residential or Commercial/Industrial/ Transportation increased from 26.6% to 38.5%. From 1992 and 2010, human population increased 70% in the watershed upstream of KEMO and 52% in the area surrounding the park. |
| **Cultural Resources** | | web ▸ |
| **Archeological Resources** |  | Less than 1% of the park acres deemed appropriate for survey have been adequately surveyed for archeological resources. Documentation for National Register purposes is incomplete and out of date. Of the 23 known sites, 74% are in Good condition, 13% are in Fair condition, and 13% are of unknown condition |
| **Cultural Anthropology** |  | No Ethnographic Overview and Assessment exists for the park, but the relationship of the park's ethnographic resources and historic contexts has been partially documented in various park reports that were primarily developed for other purposes. |
| **Cultural Landscapes** |  | Cultural landscapes are listed as Fundamental Resources of the park with a management category of "Must be Preserved and Maintained." The park is listed in the National Register, and two Cultural Landscape Inventories (CLIs) were completed for the property in 2009—one for the park overall, and one for the Cheatham Hill component. When new lands are added to the park, the CLIs will need to be updated. A Cultural Landscape Report with treatment recommendations is in draft form and under review. |
| **Historic Structures** |  | 29 of the 33 (88%) structures listed on the park's List of Classified Structures are in Good Condition, 3 are in Fair condition, and one (the Big Kennesaw Antebellum Road) is in Poor condition. All known historic structures have been adequately documented for National Register purposes. |
| **History** |  | 100% of the park's current historic properties have been adequately documented. A Historic Resource Study was completed 18 years ago in 1995, and the administrative history for the park was completed in 1994. |
| **Museum Collections** |  | Only 14% of the park's collections are accessioned and catalogued, with the bulk of the backlog being archives. An exhibit plan for the park visitor center was completed in 2002. The overall condition of the collection is currently Good, but there are concerns about being able to maintain the current level of stewardship. |
| **Visitor Experience** | | web ▸ |
| **Number of Visitors** |  | Kennesaw Mountain NBP has the highest visitation of any Civil War battlefield park in the nation. The total of 1,935,909 visitors to the park in 2012 was 41% higher than the 10-year average of 1,370,310 visitors for 2002–2011. |
| **Visitor Satisfaction** |  | Based on the standard visitor satisfaction survey conducted each year, the percentage of visitors satisfied in FY12 was 99.0%, compared to the average of 98% for the previous five years. |

| Priority Resource or Value | Condition Status/Trend | Rationale |
|---|---|---|
| **Interpretive and Education Programs – Talks, Tours, and Special Events** |  | The park is located in a county of 750,000 people. There is extensive opportunity to educate and interpret the historical importance of the Civil War and the Atlanta Campaign. In FY12, the park presented 35 education programs, 74 interpretive programs, and four special events, reaching a total of 15,700 visitors. Preparations are being made for the 150th anniversary of the battles related to the Atlanta Campaign in 2014. |
| **Interpretive Media – Brochures, Exhibits, Signs, and Website** |  | The recently-completed sign plan will be implemented in FY13. Highway guides, road guides, and trail guides as well as boundary signs will be added throughout the park and surrounding area. Museum exhibits encompass a wide range of American Civil War Atlanta campaign topics and remain a highlight for visitors. The new park brochure was released in August 2012, and a new high-definition park orientation film is in the final stages of development and will be released in FY13. The park is in need of a wayside plan. The current condition of the limited waysides is poor. |
| **Recreational Opportunities** |  | The park provides one of the largest contiguous federally managed public green spaces in a major metropolitan area serving millions of recreationists each year, and has more than 18 miles of designated trails used for hiking, running, dog walking, and horseback riding. The park was designated by the Audubon Society as Georgia's first Important Bird Area, and attracts bird watchers throughout the year, particularly during the spring and fall migrations. |
| **Accessibility** |  | The park visitor center, parking areas, and shuttle bus are compliant with the Americans with Disabilities Act (ADA). The park brochure is available in Braille, and the new park orientation film will have closed captioning. The buildings that house the administrative staff and visitor protection staff are not handicap accessible. The waysides are not ADA compliant. |
| **Safety** |  | The number of recordable incidents is increasing because of the large increase in visitation, with more than 2,000 law enforcement incidents last year. There has been an increase in the number of traffic accidents within the park. Operational Leadership Training has been completed by all staff, and CPR and first aid training are offered to all staff on a space available basis. |
| **Partnerships** |  | In 2012, 1,600 volunteers contributed more than 24,000 hours to help with park stewardship. The park works with a variety of partners and continues to seek opportunities to develop new partnerships. The Trail Club has been assisting the park for more than 10 years with development and maintenance of trails. |
| **Park Infrastructure** | | web ▸ |
| **Overall Facility Condition Index** |  | The 136 assets at Kennesaw Mountain National Battlefield Park have an overall FCI of 0.001, which is Good based on industry and NPS standards. FCI is the cost of repairing an asset, such as a building, road, trail, or water system, divided by the cost of replacing it. |
| **Energy Consumption** |  | The park recently installed a 60KW solar array atop the Visitor Center and installed energy-efficient lighting to reduce greenhouse gas emissions and save energy. As a result, energy usage (BTUs per gross square footage of buildings) at the park in 2012 was 64% lower than the average for the previous 3 years. |
| **Water Consumption** |  | Water consumption at the park in 2012 was 19.6% higher than the 4-year average for 2008–2011 as a result of water needed to establish new landscaping around the visitor center and some broken pipes that have since been repaired. |

# Summary of Stewardship Activities and Key Accomplishments to Maintain or Improve Priority Resource Condition:

The park has made vast improvements to the park through the planning and protection of cultural resources, improving visitor services and infrastructure, and monitoring the natural resources of the park. Below are some of the highlights:

- The park has 11 miles of intact Civil War earthworks including trench lines and cannon fortifications. With park visitation at 1.9 million visitors in FY12, it is imperative that the earthworks be protected for generations to come. The park completed the Earthworks Management Plan in conjunction with the Cultural Landscape Plan in FY12, a yearlong project.

- With the commemoration of the Sesquicentennial of the Civil War, 2011–2015, it was apparent to the park that the current park orientation film did not capture the whole story of what happened at Kennesaw Mountain in 1864. The making of a new park movie occurred over a period of two years and in September of 2013, the park released the new movie depicting the story of Civil War to Civil Rights. It tells the story of how the Civil War impacted the community of Cobb County and the role of freed slaves and their support to the Union Army.

- A goal of the park is to reduce the greenhouse gas emissions and save energy. In 2010, the park completed a yearlong project and installed a 60 KW solar array atop the Visitor Center. In 2012, the park obtained a hybrid shuttle bus (electric/gas) to transport visitors to the mountain top on weekends.

- The purpose of Kennesaw Mountain National Battlefield Park is to preserve, protect, and interpret, for the benefit and inspiration of the people, the historical and natural features of this major battle site in the American Civil War's 1864 Atlanta Campaign. The nearly 3,000 wooded acres and 20 miles of trails create an obvious need to manage and monitor the park's natural resources. The NPS Southeast Coast Inventory and Monitoring Network is near completion of the Natural Resource Condition Assessment which will evaluate and summarize existing natural resource data for the park.

# Summary of Key Issues and Challenges for Consideration in Management Planning

Kennesaw Mountain National Battlefield Park preserves a vast landscape upon which occurred a strategically consequential event in perhaps the most tragic and transformational period in American history. The park has become one of the most important recreational green spaces in a major US metropolitan area, receiving more than 1.9 million visitors in 2012. It is the most visited Civil War Park in the NPS system. Managers have a continuing challenge to balance the multiple goals of preserving these outstanding cultural and natural resources while providing for increasing demands for outdoor recreation opportunities from a growing metropolitan area population. Of the utmost importance for all park users is safety.

One key issue is the mixed visitor use of the road that winds up Kennesaw Mountain. This narrow two lane road has walkers, bicyclists and cars accessing the mountaintop on weekdays. Given the steep grade and the many blind curves, it is a safety hazard with the occurrence of "near misses" between all three user groups. The park road is closed to cars and bicycles on the weekends and operates a shuttle bus with one lane designated for pedestrians. This has eased the user conflict and minimized the safety hazard of mixed recreational use of the road. Chapter 4 gives greater detail of the challenges facing the park staff.

# Chapter 1 - Introduction

The purpose of this State of the Park report for Kennesaw Mountain National Battlefield Park is to assess the overall condition of the park's priority resources and values, communicate complex park condition information to visitors and the American public in a clear and simple way, and to inform visitors and other stakeholders about stewardship actions being taken by park staff to maintain or improve the condition of priority park resources for future generations. The State of the Park report uses a standardized approach to focus attention on the priority resources and values of the park based on the park's purpose and significance, as described in the park's Foundation Document or General Management Plan. The report:

- Provides to visitors and the American public a snapshot of the status and trend in the condition of a park's priority resources and values.
- Summarizes and communicates complex scientific, scholarly, and park operations factual information and expert opinion using non-technical language and a visual format.
- Highlights park stewardship activities and accomplishments to maintain or improve the state of the park.
- Identifies key issues and challenges facing the park to inform park management planning.

The process of identifying priority park resources by park staff and partners, tracking their condition, organizing and synthesizing data and information, and communicating the results will be closely coordinated with the park planning process, including natural and cultural resource condition assessments and Resource Stewardship Strategy development. The term "priority resources" is used to identify the fundamental and other important resources and values for the park, based on a park's purpose and significance within the National Park System, as documented in the park's foundation document and other planning documents. This report summarizes and communicates the overall condition of priority park resources and values based on the available scientific and scholarly information and expert opinion, irrespective of the ability of the park superintendent or the National Park Service to influence it.

Kennesaw Mountain National Battlefield Park encompasses approximately 2,923 acres of mostly hardwood forest that preserves a Civil War battleground of the Atlanta Campaign. Between June 19 and July 2, 1864, a series of battles occurred here between Gen. Joseph E. Johnston's Confederate force of 65,000 troops and Gen. William T. Sherman's Union army of 100,000 men. Eventually, Sherman's army outflanked the Confederate force and forced them to abandon their lines. The loss of Kennesaw Mountain removed one of the last major geographic obstacles protecting Atlanta, which eventually fell to the Union army in September of 1864. The fall of Atlanta bolstered the Union army's resolve to continue the conflict and eventually led to the re-election of Abraham Lincoln as president in 1864.

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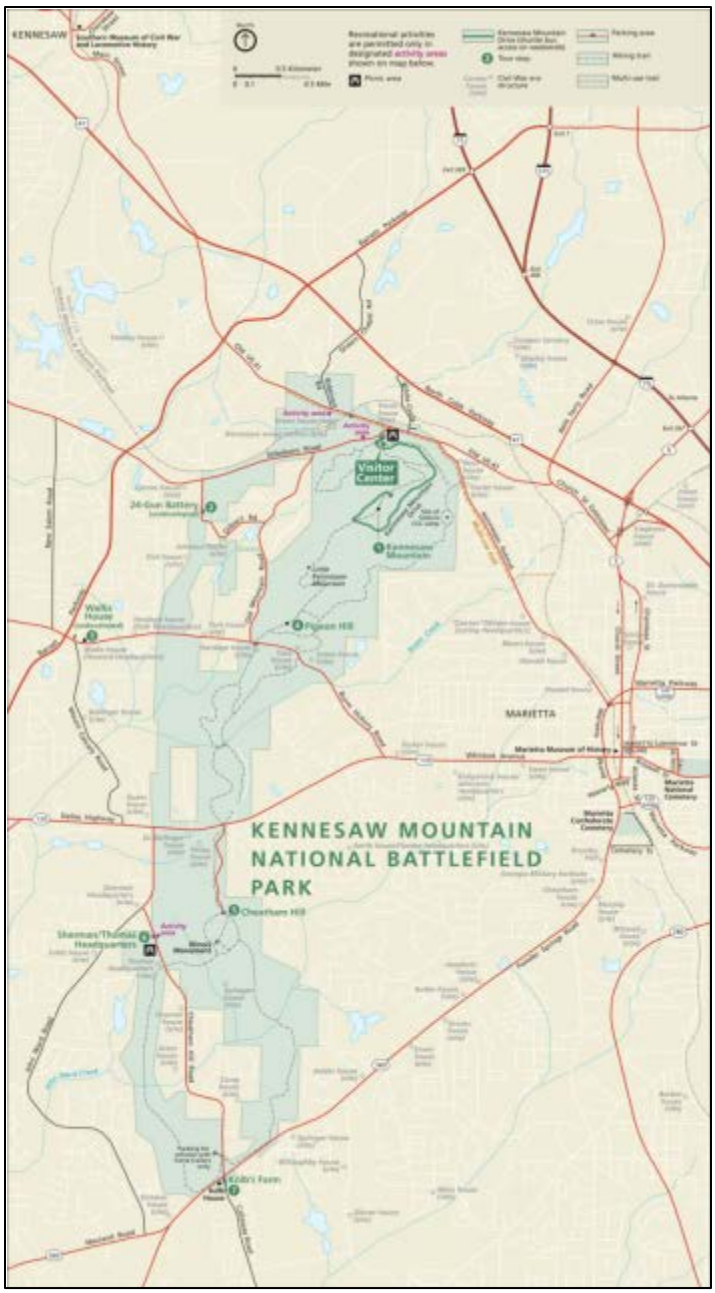



**Map of the Park. For high-resolution version, Click here**


**Location of the Park in Georgia.**

# Chapter 2 - State of the Park

The State of the Park is summarized below for four categories—Natural Resources, Cultural Resources, Visitor Experience, and Park Infrastructure—based on a synthesis of the park's monitoring, evaluation, management, and information programs, and expert opinion. Brief resource summaries are provided below for a selection of the priority resources and values of the park. Clicking on the web ▸ symbol found in the tables and resource briefs below will take you to the internet site that contains content associated with specific topics in the report.

The scientific and scholarly reports, publications, datasets, methodologies, and other information that were used as the basis for the assessments of resource condition are referenced and linked throughout the report and through the internet version of this report that is linked to the NPS IRMA data system (Integrated Resource Management Applications). The internet version of each report, and the associated workshop summary report available from the internet site, provide additional detail and sources of information about the findings summarized in the report, including references, accounts on the origin and quality of the data, and the methods and analytical approaches used in data collection and the assessments of condition. Resource condition assessments reported in this State of the Park report involve expert opinion and the professional judgment of park staff and subject matter experts involved in developing the report. This expert opinion and professional judgment derive from the in-depth knowledge and expertise of park and regional staff gained from their being involved in the day-to-day practice of all aspects of park stewardship and from the professional experience of the participating subject matter experts. This expert opinion and professional judgment utilized available factual information for the analyses and conclusions presented in this report. This State of the Park report was developed in a park-convened workshop.

The status and trends documented in Chapter 2 provide a useful point-in-time baseline measured against reference conditions that represent "healthy" ecosystem parameters, or regulatory standards (such as those related to air or water quality). We also note that climate change adaptation requires us to continue to learn from the past, but attempting to manage for conditions based on our understanding of the historical "natural" range of variation will be increasingly futile in many locations. Thus, these reference conditions, and/or our judgment about resource condition or trend may evolve as the rate of climate change accelerates and we respond to novel conditions. Our management must be even more "forward looking," to anticipate plausible but unprecedented conditions, also recognizing there will be surprises. In this context, we will incorporate climate considerations in our decision processes and management planning as we consider adaptation options that may deviate from traditional practices.

## 2.1. Natural Resources

### Air Quality

web ▸

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Ozone** | Annual 4th-Highest 8-Hour Concentration |  | The estimated ozone level for 2005–2009 at Kennesaw Mountain NBP was 82.4 parts per billion (ppb), which warrants significant concern based on NPS Air Resource Division benchmarks. Kennesaw Mountain NBP falls within a county designated by the Environmental Protection Agency (EPA) as "nonattainment" (not meeting) for the ground-level ozone standard of an 8-hour average concentration of 75 ppb. A risk assessment concluded that plants in at Kennesaw Mountain NBP were at high risk for ozone damage (Kohut 2007; Kohut 2004). No trend information is available because there are not sufficient on-site or nearby ozone monitor data (NPS ARD 2013). List of ozone-sensitive plant species. |
| **Deposition** | Sulfur Wet Deposition |  | For 2005–2009, estimated wet sulfur deposition was 4.9 kilograms per hectare per year (kg/ha/yr), which warrants significant concern based on NPS Air Resource Division benchmarks. For 2000–2009, the trend in total wet sulfur concentrations in rain and snow at Kennesaw Mountain |

| | | | |
|---|---|---|---|
| | | | NBP remained relatively unchanged (no statistically significant trend) (NPS ARD 2013). |
| | Nitrogen Wet Deposition |  | For 2005–2009, estimated wet nitrogen deposition was 4.3 kilograms per hectare per year (kg/ha/yr), which warrants significant concern based on NPS Air Resource Division benchmarks. For 2000–2009, the trend in total wet nitrogen concentrations in rain and snow at Kennesaw Mountain NBP remained relatively unchanged (no statistically significant trend) (NPS ARD 2013). |
| **Visibility** | Haze Index |  | For 2005–2009, estimated average visibility in Kennesaw Mountain NBP was 12.5 deciviews (dv) above natural conditions, which warrants significant concern based on NPS Air Resource Division benchmarks. For 2000–2009, the trend in visibility on the 20% clearest days improved and remained relatively unchanged on the 20% haziest days (no statistically significant trend). The Clean Air Act visibility goal requires visibility improvement on the 20% haziest days, with no degradation on the 20% clearest days (NPS ARD 2013). |

## Resource Brief: Historical and Projected Changes in Climate at Kennesaw Mountain NBP

Climate change, in conjunction with other stressors, is impacting all aspects of park management from natural and cultural resources to park operations and visitor experience. Effective planning and management must be grounded in our comprehension of past dynamics as well as the realization that future conditions may shift beyond the range of variability observed in historical data. Climate change will manifest itself not only as shifts in mean conditions (e.g., increasing mean annual temperature) but also as changes in climate variability (e.g., more intense storms and droughts). Put another way, land managers are dealing with both rapid directional change and tremendous uncertainty. Understanding climate change projections and associated levels of uncertainty will facilitate planning actions that are robust regardless of the precise magnitude of change experienced in the coming decades.

**Historical climate trends (1893–2012)**
Historical climate trends for Kennesaw Mountain (Fisichelli 2013) are based on historic climate data from a nearby long-term weather station (Rome, GA; cdiac.ornl.gov). From 1893 to 1958, mean annual temperature varied around a mean of 62.2 °F, and did not exhibit a significant increasing or decreasing trend (see Figure below). Temperature then dipped to a mean of 60.4 °F for the 10 year period 1958–1967. Since 1968, mean annual temperature has shown an increasing trend (+0.44 °F per decade). Annual precipitation showed strong interannual variability and no long-term linear trends over the 120-year record.

**Future climate projections**
Future climate projections for the area including Kennesaw Mountain NBP are from multi-model averaged data (Kunkel et al. 2013). Mean annual temperature, compared with the 1971–1999 average, is projected to increase 2 °F by mid-century and 4–7 °F by the end of the century, depending on the greenhouse gas emissions scenario (see Figure below). Current greenhouse gas emissions are on a trajectory similar to the higher emissions scenarios (see references in Fisichelli 2013). Warming by mid-century is projected for all seasons, with the greatest increases likely in summer and fall (Kunkel et al. 2013). There is wide agreement among individual climate models in the direction and magnitude of warming over the coming decades. Precipitation variability is likely to remain large over the coming decades, and there is greater uncertainty in precipitation than temperature projections (Kunkel et al. 2013).

In addition to warmer mean temperatures and changes in annual and seasonal precipitation, climate change will manifest itself in many other ways. This includes more frequent heat waves, droughts, floods, and an extended frost-free season. The number of days with maximum temperatures > 95 °F is projected to increase 25–30 days/year by mid-century while the number of days with minimum temperatures below freezing is projected to decrease by approximately 20 days (high (A2) emissions scenario 2041–2070 compared with 1980–2000; Kunkel et al. 2013). Small changes in total precipitation may mask large shifts in the precipitation regime and associated impacts to ecosystems. The annual number of days with heavy rainfall (> 1 inch) is projected to increase by 10 to 20% (high (A2) emissions scenario, 2041–2070 compared with 1980–2000; Kunkel et al. 2013). Significantly warmer temperatures and a more variable precipitation regime, including heavier rain events and an increased number of days between rain events, may lead to both more frequent droughts and more severe flooding and erosion.

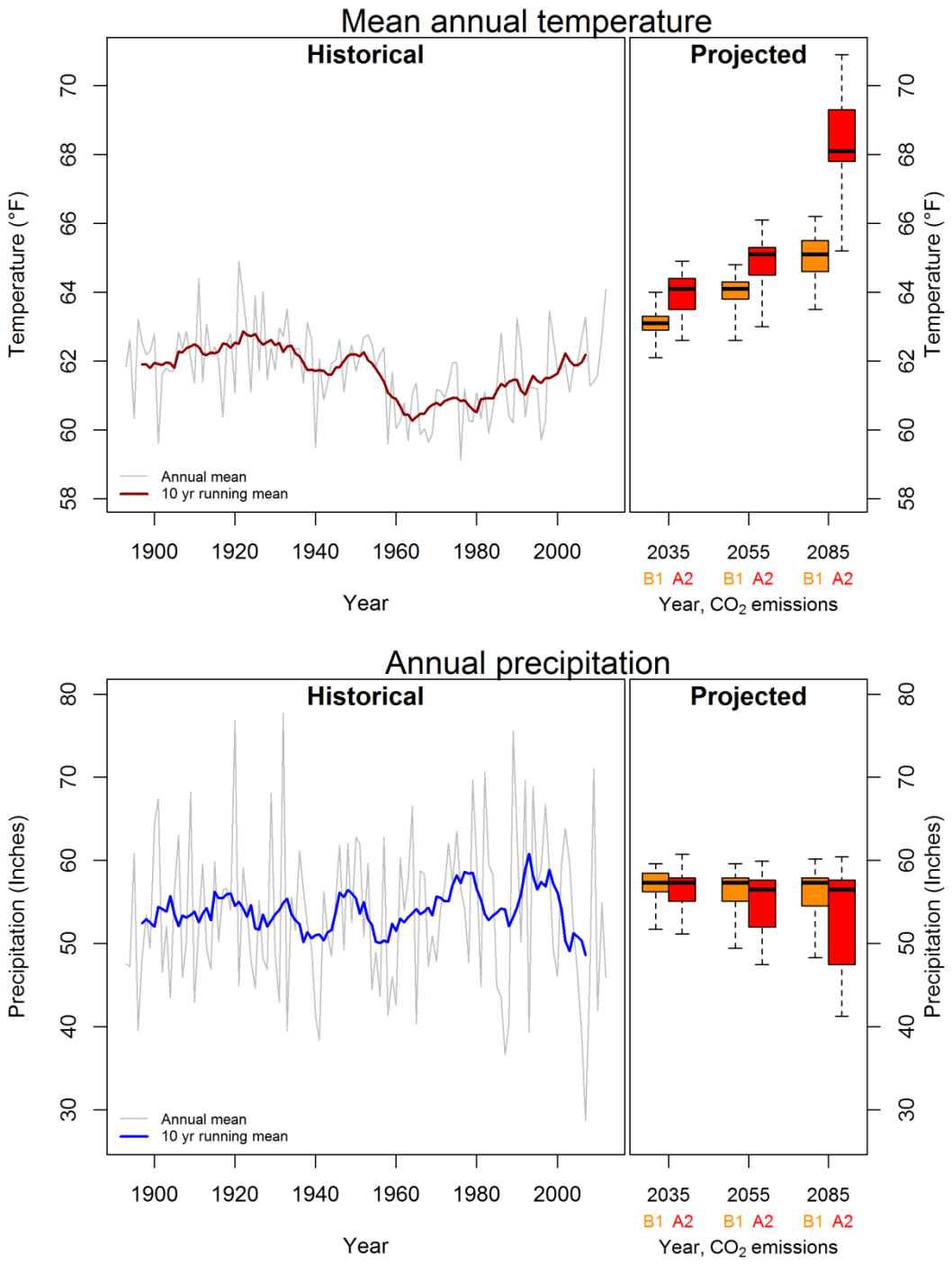



**Figure legend. Historical and projected mean annual temperature and annual precipitation for Kennesaw Mountain NBP. Historical data (1893–2012) are from the Rome, GA long-term weather station (cdiac.ornl.gov).Projected climate change (30 year means) for the region including the park (data from Kunkel et al. 2013, see Tables 4, 6 and Figures 26, 37) are for three future time periods centered on 2035 (2021–2050), 2055 (2041–2070), and 2085 (2070–2099). Two greenhouse gas emissions scenarios are presented, the low (B1) and high (A2) scenarios (IPCC 2007). Projected climate boxplots indicate the variability in future projections among 14–15 CMIP3 climate models. Values for the area including the monument are based on projected changes from individual climate models averaged across the southeast region: the bold horizontal black line represents the mean among all models, the upper and lower bounds of the boxes indicate the 75$^{th}$ and 25$^{th}$ percentile model output values and the whiskers show the minimum and maximum change averaged across the region.**

# Resource Brief: The Geologic Origins of Kennesaw Mountain

Kennesaw Mountain is made up of three summits: Big Kennesaw, Little Kennesaw, and Pigeon Hill. At the time of its formation, Kennesaw Mountain was part of a massive mountain chain whose surface has since eroded away, leaving behind tiny monadnocks, which is the Abenaki (Tribe of the Algonquian Nation) word for "Lonely Mountain." Kennesaw Mountain's geology played a large role in the advancement of Maj. Gen. William T. Sherman's Union troops toward Atlanta. All throughout north Georgia, Sherman had advanced his army southeast along the railroad from Chattanooga, Tennessee, towards Atlanta. Lt. Gen. Joseph E. Johnston would take up defensive positions, only to retreat whenever Sherman marched his troops around the Confederate army to flank them. Because of the hilly and mountainous terrain, Lt. General Johnston had a massive network of trenches and earthworks prepared to halt the Union advance. This time, when Sherman tried to march his army southwards around Kennesaw, he was stopped cold and had to deal with the sharp and massive terrain that protected Marietta, and ultimately Atlanta itself.

## Geology and Soils

web

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Terrestrial Soil Erodibility** | Soil Class Type<br>Soil Erodibility Factor |  | Soils mostly Cecil clay and Cecil sandy loam, moderate to high in erodibility (K ≈ 0.26 and ≈ 0.36, respectively). High development associated with moderate to high erosion in watershed, including near park; roads and concentrated culvert flows act as catalysts for runoff-related erosion (Burkholder et al. 2013). |
| **Riparian Soil Erodibility** | Channel Stability Index |  | Evidence of common, severe stream bank erosion (CSI likely > 20). (Burkholder et al. 2013). |
| **Stream Sedimentation** | % bankside visual estimate of sediment cover |  | Evidence of common, high, and extremely rapid sedimentation: Sediment cover is 60–80% in many stream locations. (Burkholder et al. 2013). |
| **Soil Acidity** | Soil pH |  | Optimal soil pH for the Southeast is 5.8 to 7.5 but acid deposition in the area is high and of moderate concern. |

## Water Quantity and Quality

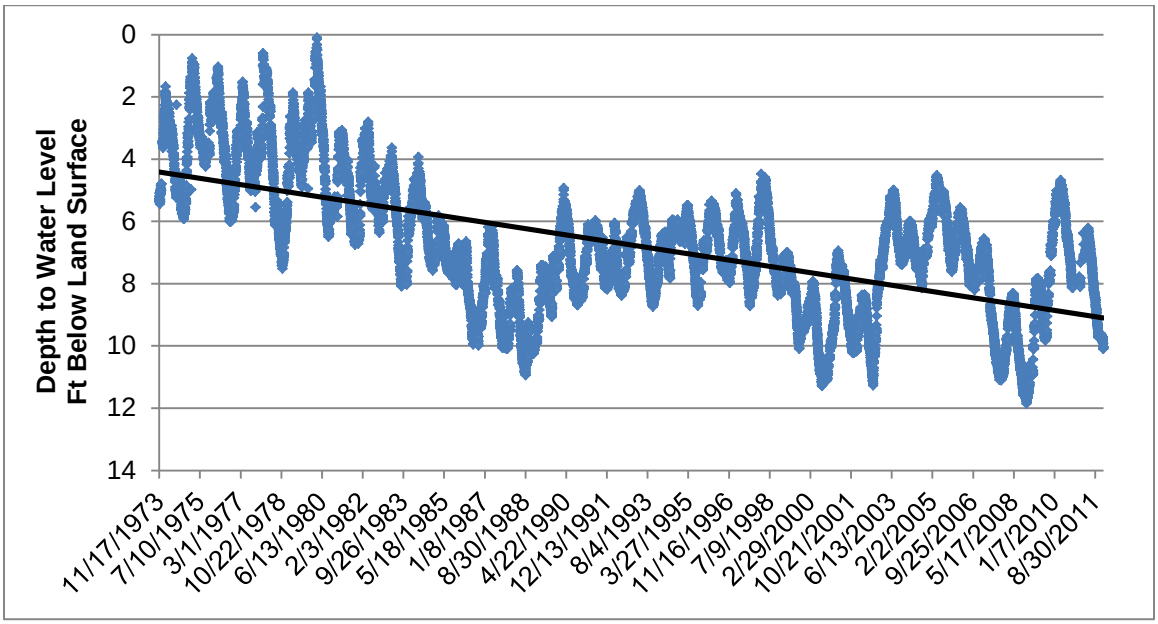
web

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Groundwater Quantity** | Groundwater level |  | Groundwater levels have decreased significantly at the two wells near the park where the period of record exceeds 10 years (Rasmussen et al. 2009). Recent records indicate stable groundwater levels (Wright 2012). Data on groundwater levels are available from USGS. |
| **Surface Water Dynamics** | Daily mean discharge<br>Mean monthly flow<br>Magnitude and duration of extreme high and low flow events |  | Magnitude and timing of flows are typical of streams draining urbanized areas (e.g., flashy flows after rain events and low base flows). No significant trends observed in the period of record beginning in 1999 based on analysis using Indicators of Hydrologic Alteration (Jones and Gregory 2012). USGS publishes the latest stream gage data for Noses Creek at Powder Springs, GA. |
| **Water Chemistry** | Temperature and pH |  | 100% of water temperature readings were within the GA minimum and maximum standards of 5 and 90 °F. 100% of pH readings were within GA minimum and maximum standards of 6.8 and 8.5 (Burkholder et al. 2013). |
| | Dissolved Oxygen<br>Biological Oxygen Demand |  | 96% of dissolved oxygen measurements were above the GA standards of average concentrations of > 5.0 mg/L and minimum concentrations of 4 mg/L. 99% of samples met the recommended concentrations of >3 mg/L for Biological Oxygen Demand. |
| | Nitrate + Nitrite<br>Total Phosphorus |  | 9% of Nitrate + Nitrite samples met EPA recommended concentration of <177 µg/L. 53% of Total Phosphorous samples met EPA concentrations of <30 µg/L. |
| | Total suspended solids |  | Although 99% of samples were in compliance with EPA standards (≤ 25 mg/L), a condition rating of "Warrants Moderate Concern" was given due to consensus among subject matter experts is that the EPA standards are too high for the types of systems present coupled with evidence of continued high sedimentation rates. |
| | Fecal coliform bacteria |  | 63% of samples were in compliance with GA standards for geometric means of < 200 (May–October), <1,000 (November–April), or EPA standard for geometric means of <400. |
| | Aluminum concentration |  | 52% of samples met the EPA recommended levels of <87 µg/L for aluminum. |
| **Benthic Macroinvertebrates** | Macroinvertebrate Index of Biological Integrity (M-IBI)<br>Hilsenhoff Biotic Index (HBI); Stream Health Rating (SHR) |  | Data are not available from sites within the park, but up- and down-stream from park (2004–2005) in the two main streams. M-IBI scores ranged from 51–64. HBI = 4.2–5.7 resulted in a rating of "FAIR". Stream Health Rating is "B". |

## Resource Brief: Groundwater Dynamics

All parks and ecosystems are linked to the groundwater system (i.e., aquifers). These aquifers are affected by modifications to surface water flow (from impoundments), changes in flooding and drought frequency, and rates of extraction. Because aquifers serve as a water supply for industrial, commercial, residential, and agricultural needs, anthropogenic demands on this freshwater resource are high. Total influences of changes in groundwater can influence hydrologic processes, wetland function, freshwater availability for fish and wildlife, plant-community species distribution, composition, diversity, and structure, and potentially affect the integrity of park ecosystems.

Kennesaw Mountain National Battlefield Park is located within the Piedmont and Blue Ridge aquifer system (Rasmussen et al. 2009). An inventory of existing wells that are in proximity to the park was conducted by the Inventory and Monitoring program in 2009 (Rasmussen et al. 2009). Trends in groundwater dynamics at KEMO are analyzed annually using data from two wells in the vicinity of KEMO. Analysis of data for the entire period of record through the end of 2011, show both wells exhibiting a significant, negative trend in groundwater levels (See example from one well below); however, recent records indicate relatively stable groundwater levels (Wright 2012).




**Depth to water level in USGS well 33420784254801 near Kennesaw Mountain NBP for the entire period of record through 2011.**

## Resource Brief: Surface Water Dynamics

Kennesaw Mountain National Battlefield Park is located in the Atlanta metropolitan area in the Allatoona Mountain Range and consists of approximately 3,000 acres of mixed hardwood pine forest and open fields with some small bog wetlands and mountain seeps. Kennesaw Mountain itself is located in the northern portion of the Park and receives approximately 1.5 million visitors per year when passing traffic numbers are counted. Less than 10% of the Park is considered wetlands and only two perennial streams flow through the park. These 2nd order streams creeks include John Ward Creek and Noses Creek, both of which originate outside the Park boundaries and drain mostly urban and suburbanized areas prior to flowing through the park.

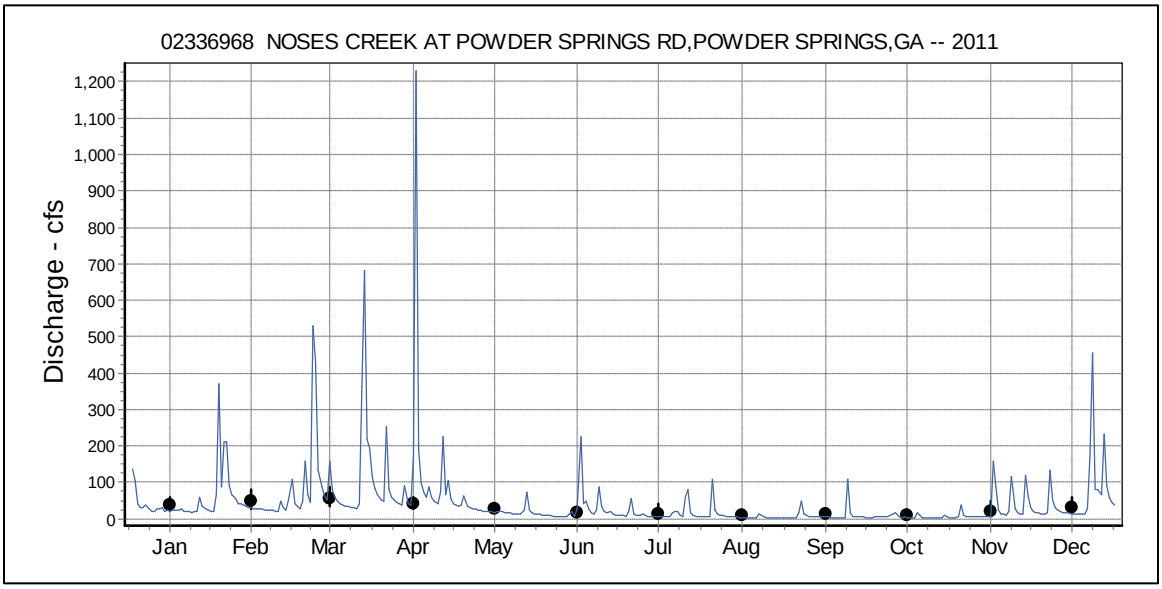
Evaluation of stream flow characteristics offers some of the most appropriate and useful indicators for assessing aquatic ecosystem integrity, and for monitoring environmental changes over time. It also provides key support data for other vital signs indicators including water quality, threatened and endangered aquatic species, wetlands, and riparian habitat. The large amount of uncertainty associated with many projections for changes in water availability due to climate change means that more data will likely be needed before the direction and magnitude of the influence can be measured. To evaluate the significance of changes in flow regimes due to naturally occurring and/or regulated conditions, the NPS Southeast Coast Inventory and Monitoring Network (SECN) began harvesting relevant data sets collected at selected sites and disseminating this data to Network parks in the context of historical flow characteristics and/or park specific flow thresholds. This analysis provides a summary of the previous year's flow conditions and provides information on overall flow variability as well as the seasonality and timing of ecologically relevant flow events in rivers near or adjacent to SECN parks.

Since August 1998, the USGS has maintained a stream gaging station in Noses Creek at Powder Springs Road in the city of Powder Springs, GA, about 10.3 km (6.4 miles) downstream from the park. The SECN I&M Network evaluated stream flow variation and the magnitude and timing of specific flow Noses Creek gaging station during 2011. Flow patterns were characterized within the context of USGS stream flow, the Nature Conservancy's (2009) Indicators of Hydrologic Alteration (IHA) software, and program Flow (Dowd

2011). The IHA software used single-period daily values in cubic feet per second (cfs) to calculate nonparametric and parametric statistical metrics including mean monthly flow values and extreme event characterization and timing. IHA was also used to calculate Environmental Flow Components (EFCs), used to characterize natural flow and departures from natural conditions. EFCs characterize flow events that have become typical (over a long period such as many years) since perturbations such as diversions or development occurred.

Findings in 2011 include:

- The lowest flows occurred from August to October when median flow dipped below 6 cfs. However, this is the normal pattern typically observed for Noses Creek and other streams in the Southeast.
- High flow pulses occurred 24 times throughout the year and a small flood event lasting 8 days occurred during April.




**Daily flow (blue line), monthly median flow (dots), and monthly interquartile range (25th and 75th percentiles; error bars) for flow on Noses Creek at Powder Springs Road, Powder Springs, GA during 2011**.

## Flora and Fauna

web

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Exotic Plants** | Number of exotic/ invasive species Number of "top ten" species present |  | Twelve invasive species identified by the Georgia Exotic Pest Plant Council as Category I occur in the park (i.e., species that invade intact systems, displace native vegetation, and alter ecological processes), including Chinese privet, kudzu, and honeysuckle. An additional invasive species of concern to park managers is garlic mustard (*Alliaria petiolata*) and the Park has been actively working on controlling the spread of this species. Active control measures are in place but long-term funding to manage continuous new invasions is tenuous. |
| **Amphibians** | Species occurrence and diversity |  | The diversity of amphibians at KEMO is high, with 23 species of amphibians documented to occur in the Park (12 species of frogs or toads, 11 species of salamanders). Long-term monitoring has been initiated using nighttime auditory surveys (Byrne et al. 2011). |

| | | | |
|---|---|---|---|
| **Birds** | Species occurrence and diversity |  | Bird species diversity is high at KEMO, with 208 species known to occur in the Park. Long-term monitoring has been initiated using distance sampling methods (Byrne et al. 2011). |
| **White-tailed Deer** | Abundance |  | The abundance of white-tailed deer in the park seems to be increasing, although there is no good estimate of deer density. Increases in deer densities in other national parks has led to a reduction in the regeneration of native forest tree species, and higher densities can lead to increased deer starvation and disease, and an increased rate of collisions with motor vehicles. |

## Resource Brief: Amphibians

Amphibian communities in the southeastern U.S. are widely considered to be among the most diverse in the world, and they are a valued resource in parks in the southeast (Byrne et al. 2011). Inventory studies at KEMO in 2004 documented 23 native species of amphibians and 21 native species of reptiles, along with 1 exotic species. The amphibians include 12 species of frogs and toads, and 11 species of newts and salamanders. Because of their complex life histories, habitat requirements, anatomy, and physiology, amphibians are considered to be good indicators of changes in ecosystem conditions as they are affected by climate change, land use development and conversion, contaminants, and changes in hydrology.

**Spring peeper (*Pseudacris crucifer*), which was the most-frequently heard frog during vital signs monitoring efforts conducted at Kennesaw Mountain National Battlefield Park in 2009.**

KEMO has 12 known vocal anurans (frogs and toads that vocalize), which were surveyed in April–May 2009 by the NPS Southeast Coast Inventory and Monitoring Network (SECN) using automated recording devices at 30 locations for 10 nights (Byrne et al. 2011). During this sampling event, six native frog species were detected and no non-native species were detected. Spring peeper (*Pseudacris crucifer*) was the most widely distributed amphibian followed by Cope's gray treefrog (*Hyla chrysoscelis*) and green frog (*Rana clamitans*). One species, green treefrog (*Hyla cinerea*), was not previously known to occur at KEMO and represents a newly documented species for this park.

**Naïve occupancy estimates (proportion of sites where the species was detected) for amphibians at Kennesaw Mountain National Battlefield Park during vital signs monitoring efforts conducted in 2009. Modified from Byrne et al. 2011).**

| Scientific Name | Common Name | Proportion of sites where seen |
|---|---|---|
| *Pseudacris crucifer* | Spring peeper | 0.14 |
| *Hyla chrysoscelis* | Cope's gray treefrog | 0.07 |
| *Rana clamitans* | Green frog | 0.07 |
| *Acris crepitans/gryllus* | Cricket frog | 0.04 |
| *Bufo fowleri* | Fowler's toad | 0.04 |
| *Hyla cinerea* | Green treefrog | 0.04 |

The SECN also conducted surveys for chytrid fungus, a pathogen linked to amphibian population declines around the world (Byrne and Moore 2011). Evidence of the fungus was found in several larval and post-metamorphic frogs (*Lithobates sp.*), but none of the individuals showed clinical signs of the disease.

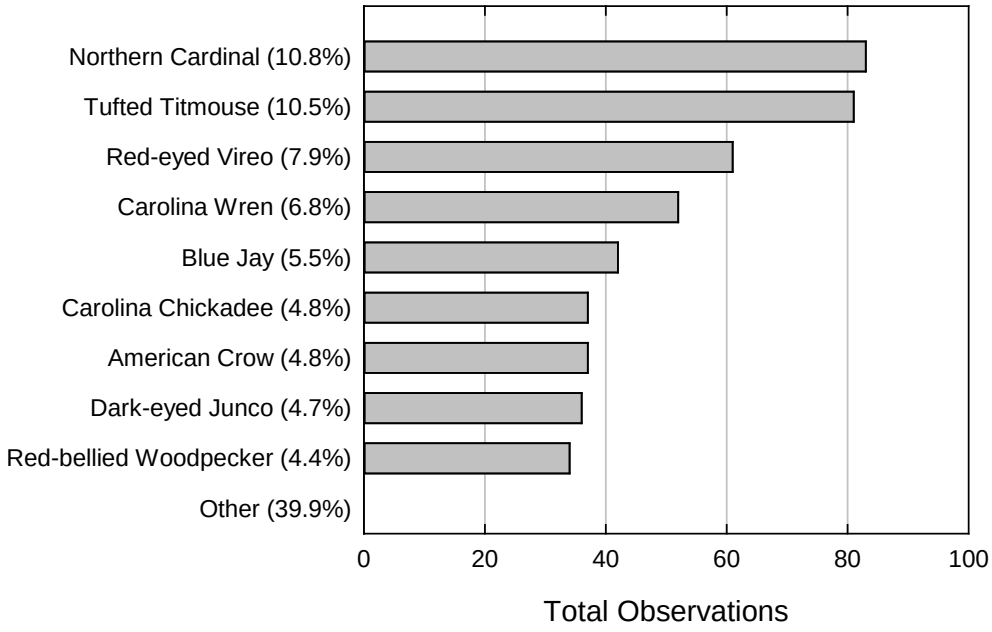
## Resource Brief: Birds

The location of Kennesaw Mountain NBP at the southern terminus of the Appalachian Mountains and forest area make it an attractive habitat for birds, especially during spring and fall migrations. As prime natural migration habitat that is critical for neotropical bird migrants (e.g., vireos, warblers), the park was designated a globally Important Bird Area in 2000, the first area designated in the State. An Avian Conservation Implementation Plan (ACIP) was prepared for KEMO in 2005 (Watson 2005). The purpose of the ACIP was to help identify and prioritize bird conservation efforts and opportunities, and to guide successful implementation of conservation activities.

**Kentucky Warbler (*Geothlypis formosa*), one of 208 species present at Kennesaw Mountain National Battlefield Park.**

As of 2013, 208 species of birds have been reported from KEMO including a large percentage of neotropical migrants. The park has three State-listed species of concern (cerulean warbler, peregrine falcon, and bald eagle), and five non-native species. Audubon WatchList (2002) previously indicated that the cerulean warbler was declining and that during spring migration this species was seen more frequently at KEMO than elsewhere in the Southeast. The major threat mentioned for this species is development and urban sprawl.

The NPS Southeast Coast Inventory and Monitoring Network (SECN) conducted a survey of landbirds in the park in 2009 and recorded total of 770 birds representing 60 species. Northern cardinal, Carolina wren, and tufted titmouse were the most widely distributed species at the Park, found at 90 – 93% of sampling locations (see graphic for the most commonly detected species below). A total of 25 priority species, as identified by Watson and Malloy (2006), were detected during the sampling effort, including Acadian flycatcher, brown-headed nuthatch, chimney swift, Cooper's hawk, Chuck-will's-widow, Eastern towhee, Eastern wood-pewee, hooded warbler, indigo bunting, mallard, Northern flicker, pine warbler, red-bellied woodpecker, red-headed woodpecker, red-shouldered hawk, summer tanager, white-eyed vireo, wood thrush, worm-eating warbler, yellow-billed cuckoo, and yellow-throated vireo.




**Relative abundance of bird species observed at Kennesaw Mountain National Battlefield Park during Vital Signs Monitoring efforts in 2009. Numbers in parentheses indicate the proportion of all observations represented by each species.**

## Dark Night Sky and Natural Sounds

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The nighttime photic environment and the perception of it by humans (the lightscape) are important to many facets of park integrity. They are both a natural and a cultural resource and are critical aspects of scenery, visitor enjoyment, and wilderness character. Many

wildlife species and ecological processes depend on natural darkness and a natural nighttime photic regime. KEMO has important cultural and natural resources, including a number of nocturnal wildlife species, and is considered to possess a higher sensitivity photic environment (Level 1). The reference condition is set at the natural condition, based on an accurate physical model of the night sky. Current conditions or desired future conditions should be expressed as a ratio over the reference condition. Learn more in the document Recommended Indicators of Night Sky Quality.

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Anthropogenic Light** | Anthropogenic Light Ratio (ALR) – the Average Anthropogenic Sky Glow: Average Natural Sky Luminance |  | The modeled Anthropogenic Light Ratio (ALR), a measure of light pollution calculated as the ratio of Average Anthropogenic Sky Glow to Average Natural Sky Luminance, was 19.67 which is considered of significant concern. The park is adjacent to the Atlanta metropolitan area with a population of 5.5 Million people and a 28% growth rate in the past decade. |
| **Noise Pollution** | Ambient sound levels |  | 2011 study of sounds in neighboring Fulton County found sound levels suggestive of poor environmental quality. Heavy and increasing vehicular traffic through KEMO suggests similar effects. |

## Resource Brief: Natural Sounds

Urban environmental noise reaches KEMO from sources such as aircraft, construction, trains, and road traffic. The NPS Management Policies and Director's Order #47, *Sound Preservation and Noise Management*, call for and direct the protection of the natural ambient soundscape so as to minimize and optimally manage noise, defined as unwanted sound, especially dissonant human-caused sounds. However, most noise sources measured in national parks (e.g. highways, airplane traffic) originate outside park boundaries, beyond NPS management jurisdiction (Lynch et al. 2011). The NPS recognizes that no single metric is adequate to characterize acoustic resources; thus, the Natural Sounds and Night Skies Division of the NPS works with several metrics and considers SPL data, spectral data, audibility data, source identification data, and meteorological data (Lynch et al. 2011).

As a "green island" surrounded by the Atlanta Metropolitan Area (AtMA), KEMO has been degraded by anthropogenic noise through increased motorized recreation and urban development (Seong et al. 2011). The AtMA, in general, has been characterized as having substantial chronic noise pollution, such as overall road traffic noise, suggestive of poor environmental quality (Kim et al. 2012). The World Health Organization has recommended that outdoor environmental noise should not exceed 55 dB (A) and 40 dB (A) for daytime and nighttime activity, respectively, to prevent potential psychosocial effects. A wide array of wildlife can also be significantly adversely impacted by chronic noise pollution. As summarized by Barber et al. (2011), noise inhibits the perception of sounds, an effect called masking. Compromised hearing can adversely alter acoustical communication (birds, frogs) and negatively affect sleeping and hibernating animals (Parris et al. 2009, Barber et al. 2010, and references therein). Noise also impacts animal physiology and behavior, and chronic stress from noise can adversely affect an animal's energy budget, reproductive success, and long-term survival (Radle 1998, Barber et al. 2010).

Seong et al. (2011: study conducted in 2008) and Kim et al. (2012: study conducted in 2009–2011) modeled road traffic noise levels in nearby Fulton County, GA. Noise levels were analyzed with raster, vector, and façade maps to estimate human exposure to high noise levels. Both studies indicated that some areas in Fulton County, receive more than 67 (and up to levels exceeding 100) dB (A) (Seong et al 2011, Kim et al. 2012). Within its intensively urbanized setting, exacerbated by well over 1.5 million cars passing directly through the parklands, KEMO would be expected to sustain similar levels of noise pollution as the Chattahoochee in the AtMA.

## Adjacent Land Cover and Use

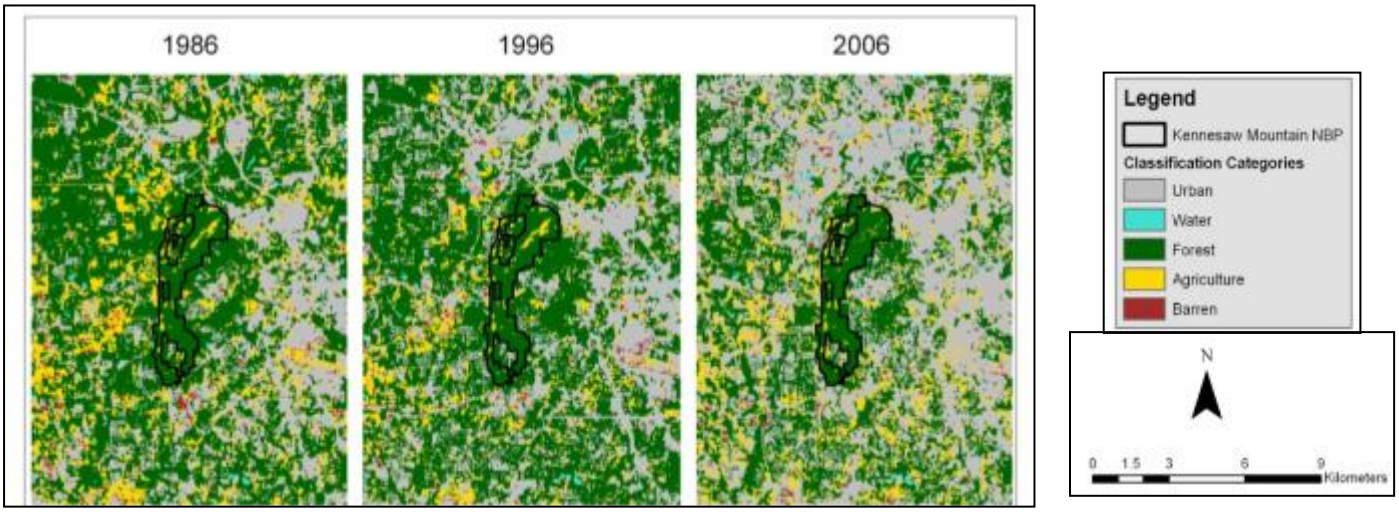
web

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Surrounding Land Cover and Use** | Forested & Wetland Land use coverage |  | Between 1992 and 2006, land uses classified as Deciduous, Mixed, and Evergreen Forest, combined with those classified as Woody or Emergent Herbaceous Wetlands, decreased from 67.6% to 42.4% of the |

| | | | |
|---|---|---|---|
| | | | watershed upstream of KEMO, and from 60% to 30% of the area surrounding the park (SECN I&M network, unpublished data). |
| | Developed land use coverage (non-open space) |  | Between 1992 and 2006, land uses classified as Low/High Intensity Residential or Commercial/Industrial/ Transportation increased from 20.5% to 25.4% of the watershed upstream of KEMO, and from 26.6% to 38.5% of the area surrounding the park. |
| **Human Population Density and Demographics** | Human Population |  | From 1992 and 2010, human population increased 70% in the watershed upstream of KEMO and 52% in the area surrounding the park. |

## Resource Brief: Adjacent Land Cover and Use

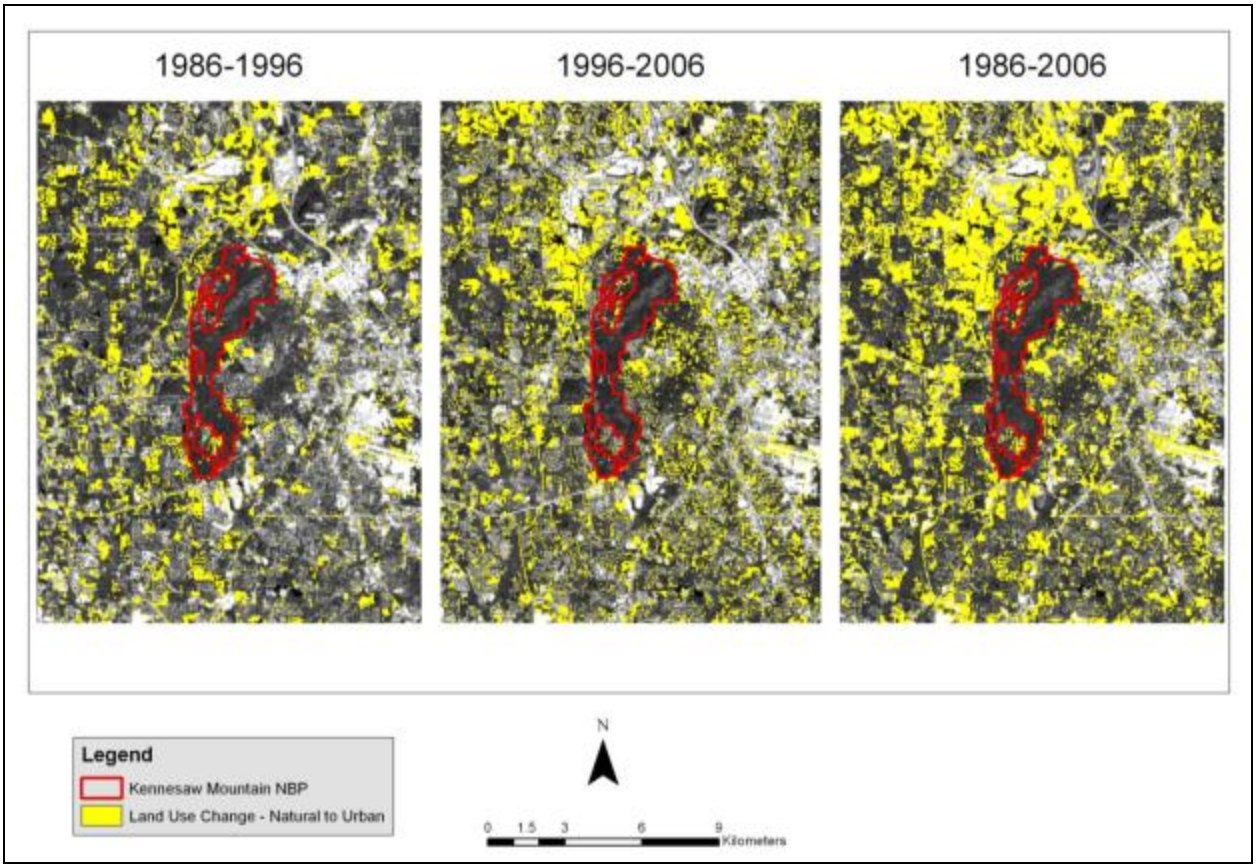
Land cover within Kennesaw Mountain National Battlefield Park is mostly deciduous and evergreen forest, with very little open water as small streams. KEMO is a small green "oasis" within a setting of increasingly-dense urbanization in the Atlanta Metropolitan Area (AtMA). Cobb County is among the most populated and fastest growing counties in Georgia; between 1980 and 2007 its population increased by ≈ 132% (U.S. Census Bureau 2012—see http://quickfacts.census.gov/qfd/states/13/13067.html). In 2012 the county had 707,442 residents with a density of 1,232 people per square kilometer ($km^2$; or 3,154 people per square mile, $mi^2$).




**Land use classification of Kennesaw Mountain National Battlefield Park and surrounding landscape based on unsupervised imagery classification (refer to the legend for land use class descriptions).**

Blankley (2011) used satellite imagery and remote sensing to investigate and quantify two decades of changes in land use surrounding KEMO from 1986 to 2006 (Figures 1, 2). He also developed buffers of various distances from KEMO boundaries, and showed evidence of four types of ecological disruption and/or fragmentation, disruption of ecological flows and cycles, elimination of seasonal habitats and/or transit corridors, and edge effects to assist in visualizing potentially harmful impacts of land use change on the KEMO ecosystem. Blankley (2011) described a "meteoric rise" in population growth surrounding the park and up to/against its boundaries (Figure 2). The extensive urbanization occurred through elimination of many natural areas and extreme fragmentation of what were once continuous green corridors.

Significant results from this analysis of KEMO and the surrounding landscape as a hypothetical ecosystem revealed that connectivity to the surrounding forest patches has decreased and fragmentation has increased dramatically. Additionally, the size of this ecosystem has decreased from 103.94 $km^2$ in 1986, to just 17.49 $km^2$ in 2006. The number of corridors connecting KEMO to the surrounding landscape also decreased from 18 to just 1 during the same time period. Given that the areas surrounding KEMO are projected to continue to urbanize, it is probable that the Park will become a forested island situated within a completely urbanized landscape.




**Change in land use from 1986 to 2006 at Kennesaw Mountain National Battlefield Park (yellow areas denote land that changed from barren, forest, and agriculture classes to the urban class).**

# 2.2. Cultural Resources

## Archeological Resources

web

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Inventory** | Percent of park adequately surveyed. |  | Less than 1% of the 2,895 acres of land in the park that is deemed appropriate for survey has been adequately surveyed for archeological resources. Historic maps, a GPS survey, and other sources indicate that there may be 40 or more sites and subsites that have never been evaluated and documented in ASMIS, including numerous Civil War features, historic farmsteads, and a historic gin mill. |
| **Documentation** | Percentage of known sites with adequate National Register documentation. |  | The 1976 National Register nomination addresses the historic district/landscape only, and none of the archeological sites have been evaluated as an archeological resource. Documentation for National Register purposes is incomplete and out of date. |
| **Condition** | Percentage of archeological resources in good condition. |  | Of the 23 known sites (with 72 subsites) documented in the ASMIS archeology database, 17 (74%) are in Good condition, 3 (13%) are in Fair condition, and 3 are of unknown condition. |

## Resource Brief: Archeological Resources Protection Act

Artifacts tell an important story about what they are and who left them. The context in which an artifact is found is often the most important component of the area's history because the location adds an unmistakable component. Additionally, the artifacts will also provide tangible evidence that can substantiate both written and oral history. When an artifact is removed without documentation or regard for its location, much of the story becomes lost forever. Civil War armies and civilians of the era left many artifacts behind, and they all help to piece together moments in time that our modern society has yet to discover. Civil War artifacts, such as those remaining on the battlefield at Kennesaw Mountain, are protected so that future generations, perhaps utilizing new technology and techniques, can also study and learn about our nation's history. The Archeological Resources Protection Act of 1979 (16 United States Code 470) made the act of digging, altering, or removing artifacts from public lands illegal. The law also made the act of selling, buying, or transporting the artifacts illegal, any of the described acts becoming a felony offense. The Kennesaw Mountain National Battlefield Park staff remains ever watchful over the battlefield, the artifacts that lay within it, and the other sensitive aspects of our culture's history.

## Cultural Anthropology

web ▸

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| Knowledge | Sufficient research exists to understand the relationship of the park's ethnographic resources and the historic contexts |  | No Ethnographic Overview and Assessment exists for the park, but the relationship of the park's ethnographic resources and historic contexts does exist. |
| | Appropriate studies and consultations document ethnographic resources and uses with regards to the park. |  | No documented ethnographic overview and assessment exists for the park. Other documents provide a good foundation for understanding people and communities associated with the park, but they do not provide the depth and nuance that a cultural anthropological focus on the site would reveal including identifying underrepresented groups and their associations with the park historically and presently. |

## Cultural Landscapes

web ▸

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| Knowledge | Sufficient research exists to understand the relationship of the park cultural landscapes to the historic contexts of the |  | There is sufficient research to provide an understanding of the relationship between the park's cultural landscapes and historic contexts. |

| | | | |
|---|---|---|---|
| | park. | | |
| | Adequate research exists to document and preserve the cultural landscape of the park. |  | Two Cultural Landscape Inventories were completed in for the park in 2009—one for the park overall and one for the Cheatham Hill component. A Cultural Landscape Report with treatment recommendations is in draft form and under review. |
| **Inventory** | The scope of cultural landscapes in the park is understood and a determination has been made whether or not they are a fundamental resource. |  | Cultural landscapes are listed as Fundamental Resources of the park that must be preserved and maintained. |
| | Percentage of landscapes eligible for the National Register with accurate, complete, and reliable Cultural Landscape Inventory (CLI) data. |  | The park is listed in the National Register and 100% of its current landscapes have complete and certified CLIs. When Congress incorporates the Wallis House and Harriston Hill into the park boundary, the CLI will need to be updated, along with a separate, or updated, CLR. |
| **Documentation** | Percentage of cultural landscapes with adequate National Register documentation. |  | The park is listed in the National Register and most cultural landscape features are adequately documented. Exceptions include: the Hensley property; the fourth corner of Powder Springs and Calloway roads; circulation features leading to Kennesaw Mountain summit; the CCC Camp Site; Maintenance Complex; and newly acquired properties as they are incorporated into the park. |

## Resource Brief: Cheatham Hill/ Dead Angle/ Illinois Monument

The site of probably the most intense fighting on the Kennesaw line in June, 1864 and the first area of what became Kennesaw Mountain National Battlefield Park to be preserved is now known as Cheatham Hill. Known in June, 1864, as the Dead Angle, it is the point chosen by Major General George Thomas to have forces under his command make a frontal assault. The purpose of the assault was to break through and roll up the Confederate defensive line.

In 1898 veterans who were members of the Colonel Dan McCook Brigade led in the purchase of sixty acres of land where they had participated in the assault on the morning of June 27, 1864. Following acquisition of the land money was raised to fund the construction of a monument to those who had participated in the assault. A major contributor to the funds necessary for the construction of the monument was the state of Illinois. On June 27, 1914 the Illinois Monument was dedicated just in advance of the remaining earthworks of the Dead Angle.

## Historic Structures

web

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Knowledge** | Percentage of historic structures evaluated using appropriate historical contexts. |  | All known historic structures have been evaluated and are included on the List of Classified Structures. |
| **Documentation** | Percentage of historic structures with adequate National Register documentation.<br><br>All historic structures have been recorded commensurate with their significance and mandated purposes. |  | All known historic structures have been adequately documented for National Register purposes. LCS information is current for the 33 structures, but only one Historic Structure Report has been completed (for Kolb Farm House). |
| **Condition** | Percentage of historic structures in good condition. |  | 29 of the 33 (88%) structures listed on the park's List of Classified Structures are in Good Condition, 3 are in Fair condition, and one (the Big Kennesaw Antebellum Road) is in Poor condition. |

## Resource Brief: Kolb Farmhouse

One of the earliest settlers of Cobb County, Georgia, Peter Valentine Kolb II built the log house in 1836 and operated a self-sufficient farm with 10 enslaved workers and about 600 acres of land. When Federal troops approached the farm along Powder Springs Road in 1864, the family fled. On the afternoon of June 22, 1864, General Hood's Confederates were repulsed in an ill-fated attack just north of Powder Springs Road. The battle damaged the house and destroyed several of the outbuildings. After the Battle of Kolb's Farm, Union General Joseph Hooker used the Kolb house for his headquarters. The Kolb family did not return to the house until the 1880s.

The Kolb farmhouse is the only remaining park building that existed during the Battle of Kennesaw Mountain and is a rare example from an early period of Cobb County settlement. The farmstead has been compromised by the loss of its associated farm acreage, vegetation patterns, and outbuildings, as well as the widening of Powder Springs Road. The National Park Service,

starting in 1963, has rehabilitated the exterior of the farmhouse to its 1830s appearance. When removing the more modern clapboard siding, they revealed the original hewn logs. The interior, although adapted to serve as park quarters, still reflects the original Georgian plan. Most of the original 1830s historic fabric was retained in the rehabilitations. Both the house and the cemetery remain in their original location.

## History

web

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Knowledge** | Sufficient research is conducted to understand significance of site.<br><br>Sufficient research is conducted to establish the reasons for park creation and site history. |  | A Historic Resource Study was completed 18 years ago in 1995. The administrative history for the park was completed in 1994. |
| | Research at the appropriate level precedes planning decisions involving cultural resources. |  | The park historian is not always able to conduct the appropriate level of research preceding planning decisions because of increasing administrative workload and collateral duties. |
| **Inventory** | Percentage of cultural resources listed in appropriate Servicewide inventories, including the National Register. |  | 100% of cultural resources are listed in the appropriate inventories. |
| **Documentation** | Percentage of historic properties with adequate Nat'l Register documentation or with Determinations of Eligibility. |  | 100% of the park's current historic properties have been adequately documented. However, when Congress incorporates the Wallis House and Harriston Hill into the park boundary, additional National Register documentation will be needed. |

## Resource Brief: Thunder on the Mountain—Rediscovering a Civil War Cannon

The Model 1857 12-pounder Napoleon gun is the most common artillery piece of the Civil War. This example, exhibited in the Kennesaw Mountain NBP museum, was manufactured in 1863 by the Revere Copper Company of Boston, Massachusetts, and is mounted on a reproduction carriage equipped with reproduction implements. The manufacturer's markings on its muzzle match those seen on a Union Army cannon photographed by George Bernard in the captured Confederate defensive works of Atlanta shortly after its fall and occupation. The muzzle face markings include the following inscriptions: No. 211, Revere Copper Co., 1229, TJR, 1863.

Research identifies the cannon as one of six Napoleons serving with Battery M of the 1st New York Light Artillery of

Sherman's XX Corps. It is undoubtedly a veteran of the Battles of Kolb's Farm and Kennesaw Mountain and was discovered early in 1998 still in Federal service, this time as a display cannon at Chickamauga/Chattanooga National Military Park. This is the only cannon in the Kennesaw Mountain collection whose service can be verified.

## Museum Collections

web

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Inventory** | The scope of museum collections in the park is understood. All resources have been surveyed to determine their appropriateness for inclusion in the museum/archive collection. |  | The Scope of Collections Statement was completed in 2009. It is supported by the Enabling Legislation, resource management goals and objectives, interpretive themes, and the recent Foundation Document. |
| | Percentage of objects accessioned and cataloged. |  | Only 14% of the park's collections are accessioned and catalogued (FY 2012 Collections Management Report). The bulk of the backlogs are archives. |
| **Documentation** | Furnishings in historic structures are documented in a historic furnishings report. |  | An exhibit plan for the park visitor center was completed in 2002. |
| **Condition** | Overall condition of the collection based on condition survey and improvements to storage. |  | Collections condition surveys were completed in 1998 and 2009, and a collections storage plan was completed in 2010. The overall condition of the collection is currently Good, but park staff is concerned about being able to maintain that condition because of increasing workloads from collateral duties and administrative requirements, and funding constraints. |

# 2.3. Visitor Experience

## Visitor Numbers and Visitor Satisfaction

web

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Number of Visitors** | Number of visitors per year |  | Kennesaw Mountain NBP has the highest visitation of any Civil War battlefield park in the nation. The total of 1,935,909 visitors to the park in 2012 is higher than that of 2010 (1,512,191) and 2011 (1,748,436) and also higher than the 10-year average of 1,370,310 visitors for 2002–2011. |

| | | | |
|---|---|---|---|
| **Visitor Satisfaction** | Percent of visitors who were satisfied with their visit |  | Based on the standard visitor satisfaction survey conducted each year, the percentage of visitors satisfied in FY12 was 99.0%, which is higher than the average for the previous five years (98.0%) and ten years (97.6%). Source: 2012 Visitor Survey Card Data Report |

## Interpretive and Education Programs – Talks, Tours, and Special Events

web

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Education Programs** | Number and quality of programs, and number of participants |  | The park hosts local school groups who visit the park primarily to learn about the Civil War. An average of 1,400 students has attended educational programs at the park from FY07–12, with a range of 955 to 1,901 students during that period. There are 112 public schools that host 108,000 students in the local community. There is great potential to increase educational outreach. |
| **Junior Ranger Programs** | Number of programs and attendance |  | The park revised the Junior Ranger booklet in 2010 and the popularity has increased to a distribution and completion rate of 393 booklets in FY 2012. |
| **Special Events** | Variety and longevity of events, community involvement |  | The park is preparing for special events in 2014 associated with the 150th anniversary of the battles related to the Atlanta Campaign. An anniversary program has been held annually for more than 30 years. Every five years, the park has a 9/11 memorial featuring a field of more than 3,000 flags and substantial community involvement. |

## Resource Brief: Living History Interpretation

Kennesaw Mountain National Battlefield Park initiated its Volunteer-in-Parks program in March, 1972. Of the initial nine volunteers four were involved in Living History presentations. The program has expanded and contracted in the intervening forty years until it reached its current standard of more than 12 annually trained volunteers whose main effort is to fire the park's reproduction artillery piece, give musket firing demonstrations and conduct camp life demonstrations. The Living History program has always stressed a compromise of current and nineteenth century lifestyles. The firing of weapons has always been seen as a way to attract a crowd so that information on causes of the war, clothing, food, shelter and contributing technology could be shared with the visiting public.

As stated in the Kennesaw Mountain National Battlefield Park Long-Range Interpretive Plan adopted in 2010, Living History will allow visitors to have the opportunity to hear gunfire, listen to period music, smell camp fire smoke and have other participatory experiences.

## Interpretive Media – Brochures, Exhibits, Signs, and Website

web

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Wayside Signs** | Condition and currency of signs |  | Wayside signs are in poor condition due to age and weather. A wayside plan is necessary to begin the process of improving and expanding the park's waysides. |
| **Park Directional Signs (off-site)** | Usefulness, quantity, and placement |  | The recently-completed sign plan will be implemented this year. Highway guides, road guides, and trail guides as well as boundary signs will be added throughout the park and surrounding area. |
| **Exhibits** | Currency and quality of visitor center exhibits |  | Museum exhibits encompass a wide range of American Civil War Atlanta campaign topics and remain a highlight for visitors. |
| **Print Media** | Accuracy and availability of primary park publications |  | The new park brochure was released in August 2012. Additional site bulletins are also available to provide supplemental information about the Civil War and the events at Kennesaw Mountain NBP, and the geology of the area. |
| **Audio-visual Media** | Orientation Films |  | A new high-definition park orientation film is in the final stages of development. |
| **Websites** | Currency and scope of website; number of website visitors |  | The park website has been updated by an intern from the Student Conservation Association, but when that position ends, staff levels are insufficient to maintain the time intensive demands of a relevant web presence in a rapidly developing suburban setting. |
| | Social media: Facebook updates and "likes," overall activity |  | The park has updated Facebook and Twitter accounts, There are more than 6,400 "likes" on the park's Facebook page. Park staff will not be able to maintain the sites at the same level once the SCA intern leaves. |

## Recreational Opportunities

web

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Trails** | Number of visitors using trails |  | The park provides one of the largest contiguous federally managed public green spaces in a major metropolitan area serving millions of recreationists each year. There are more than 18 miles of designated trails used for hiking, running, dog walking, and horseback riding. Organized groups such as cross county teams also value the park for its trails. |

| | | | |
|---|---|---|---|
| **Wildlife Viewing** | Number of visitors in park to view wildlife |  | The park was designated as the State of Georgia's first Important Bird Area by the Audubon Society, and attracts bird watchers throughout the year, particularly during the spring and fall migrations. Deer, turkeys, and snakes are also mentioned in visitor surveys. |
| **Picnicking** | Number of visitors in park for picnicking |  | The park has and two established picnic areas and three activity areas that are popular for picnicking, especially on the weekends. |

## Accessibility

web

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Mobility** | ADA compliance |  | The park visitor center, parking areas, and shuttle bus are compliant with the Americans with Disabilities Act (ADA). The business offices are not ADA compliant. |
| **Visual accommodation** | ADA compliance |  | Visitor center exhibits include a tactile component with Braille description. The park brochure is available in Braille. The waysides are not ADA compliant. |
| **Auditory accommodation** | ADA compliance |  | The new park orientation film will have closed captioning. The waysides are not ADA compliant. |

## Safety

web

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Number of law enforcement incidents** | Recordable incidents |  | The number of recordable incidents is increasing, with more than 2,000 law enforcement incidents last year. Park staff cooperates regularly with local law enforcement. |
| **Number of accidents or injuries** | Recordable incidents |  | There has been an increase in the number of traffic accidents within the park. EMS response time is generally less than 5 minutes. |
| **Staff safety and training** | Number of staff trained |  | Operational Leadership Training has been completed by all staff. Regular safety meetings are scheduled throughout the year, and safety messages are routinely delivered by email. CPR and first aid training are offered to all staff on a space available basis. |

## Resource Brief: Kennesaw Mountain Trail Club (KMTC)

In the spring of 2002, two local Boy Scout leaders were using the trail over Little Kennesaw Mountain to train for a backpacking trip. During their hike they realized that the trail was in such poor condition that they decided to volunteer in order to help repair the trail. With the guidance of the park's maintenance supervisor and the Georgia Appalachian Trail Club, the KEMOTrail Corps, Inc. was established. Later renamed the Kennesaw Mountain Trail Club, the first organized trail club activity was held in October of 2002. A month later, the first official trail work day hosted 60 volunteers repairing the trail on Kennesaw Mountain.

In 2005, the Kennesaw Mountain Trail Club received its IRA 501(c)(3) not for profit status from the IRS. By 2010, the Trail Club expanded their volunteer objectives and established the Trail Ambassador program to provide volunteer-based guide services, park interpretive information, and trail patrol functions. The Kennesaw Mountain Trail Club continues to assist Kennesaw Mountain National Battlefield Park in maintaining its hiking and equestrian trails, removal of invasive plant species as well as greet and assist visitors to the park. The humble beginnings of the KMTC have grown to over 1,200 volunteers who have provided over 16,000 hours of volunteer service. The members of the Kennesaw Mountain Trail Club continue to be dedicated park partners in preserving the beauty and history of Kennesaw Mountain National Battlefield Park.

## Partnerships

web

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale Comments |
|---|---|---|---|
| **Volunteers** | Number and hours contributed |  | In 2012, 1,600 volunteers contributed more than 24,000 hours to help with park stewardship. The number of volunteers and volunteer hours has increased during the past five years. |
| **Partnerships** | Number of official and unofficial partnerships |  | The park works with a variety of partners and continues to seek opportunities to develop new partnerships. The Trail Club has been assisting the park for more than 10 years with development and maintenance of trails. |

# 2.4. Park Infrastructure

## Overall Facility Condition Index

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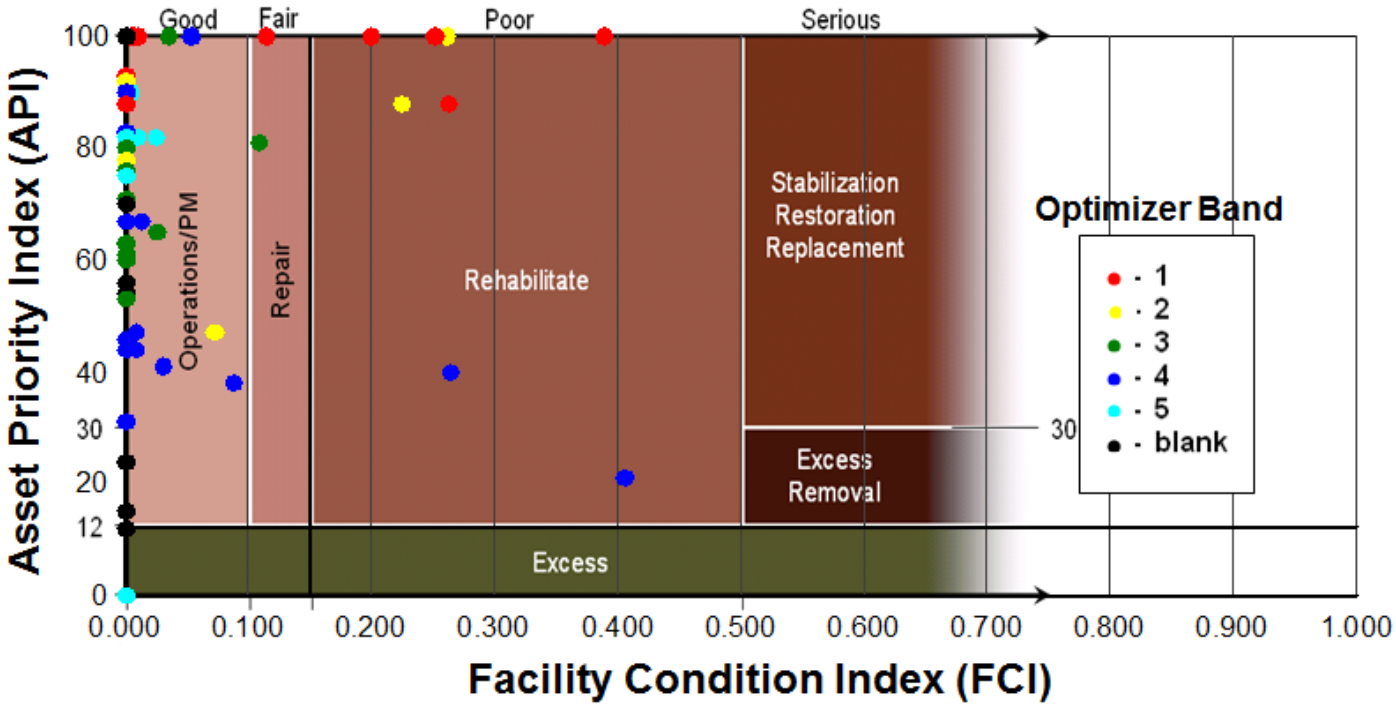
The National Park Service uses a facility condition index (FCI) to indicate the condition of its facilities and infrastructure. FCI is the cost of repairing an asset, such as a building, road, trail, or water system, divided by the cost of replacing it. The lower the FCI number, the better the condition of the asset. The condition of the buildings and other infrastructure assets at each park is determined by regular facility inspections, or "condition assessments", including daily informal inspections and formal yearly inspections. Deficiencies identified from these assessments are documented in the NPS Facility Management Software System and the cost for each repair determined. Repairs that cannot be completed within the year count against the condition of a structure. The total cost of these deferred repairs divided by the total cost to replace the structure results in the FCI, with values between 0 and 1 (the lower the decimal number, the better the condition). The FCI is assigned a condition category of Good, Fair, Poor, or Serious based on industry and NPS standards. Deferred maintenance projects that require additional funding are identified based on FCI. Planned preventive maintenance on critical components occurs during the year, using a park's base budget. For additional information about how park managers use information about the condition of facilities and infrastructure to make decisions about the efficient use of funding for maintenance and restoration activities at the park, Click Here.

| Asset Category | Number of Assets 2008 / 2012 | FCI 2008 / 2012 | Condition Status/Trend | Rationale |
|---|---|---|---|---|
| **Buildings** | 10 / 10 | 0.011 / 0.023 |  | All of the park buildings are in Good condition except for the Kolb Farm House. Park staff performs ongoing routine maintenance and routine repairs, and funding requests have been submitted to correct deficiencies. |
| **Trails** | 12 / 14 | 0.027 / 0.005 |  | The Trail Club has been instrumental in ongoing routine maintenance and routine repairs. Grants and PMIS projects have been written to request funding to correct deficiencies. |
| **Waste Water Systems** | 1 / 1 | 0.000 / 0.000 |  | Septic tanks were removed at the Maintenance, Administration and Visitor Center building, and the park sewer system has been connected to the county system. Kolb Farm House has one septic system and is serviced when needed. |
| **Unpaved Roads** | 10 / 5 | 0.016 / 0.000 |  | The unpaved roads and bridges are maintained by park staff in cooperation with Cobb County maintenance crews. |
| **Paved Roads, Parking Areas, Bridges, Tunnels** | 24 / 32 | 0.050 / 0.058 |  | Cobb County maintains most of the paved park roads. Facility Management Division performs ongoing routine maintenance and routine repairs on paved roads, parking areas and bridges. PMIS projects have been written for deficiencies. |
| **All Others** | 26 / 74 | 0.000 / 0.000 |  | The All Others category includes the park's radio and telephone systems, a number of earthworks, fields, picnic areas, interpretive signs, and monuments, which overall are in good condition. |

Another important facilities management planning tool used at a park is the Asset Priority Index (API). It identifies the importance of the various infrastructure components at a park. The API is determined using five criteria, and is calculated out of 100 possible points.

The criteria are weighted based on their importance to NPS core priorities. They are distinct to ensure that each aspect of the asset is measured independently. As a result, most assets will not rate high in every category.

The scatterplot (below) for 2012 shows the FCI for each of the infrastructure asset types at Kennesaw Mountain National Battlefield Park. It plots buildings, trails, roads, parking areas, and other infrastructure assets against its Asset Priority Index (API). Park managers and maintenance staff use the FCI and API data for each park asset to focus on preventive maintenance and repairs to facilities that are most critical to their parks.



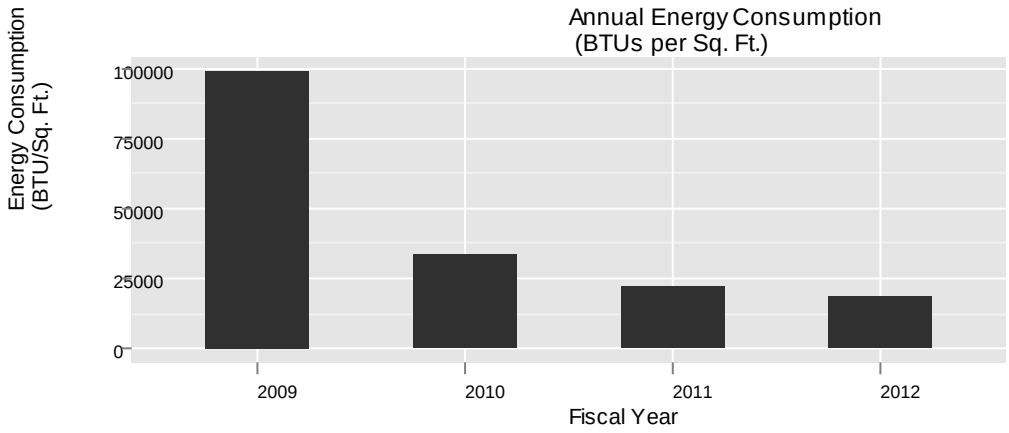

Optimizer bands—the color of the dots in the scatterplot—are assigned to each facility or asset as a tool to prioritize use of limited funding to maintain park infrastructure. Optimizer Band 1 includes those assets with the highest maintenance priorities. These assets are most important to the park—often linked to the park's enabling legislation or have high visitor use—and usually are in the best condition. Band 1 assets receive the highest percentage of base funding for routine operations, preventive maintenance, and recurring maintenance to keep them in good condition with proactive, planned maintenance. These assets are important to park operations, but because fewer park base dollars are available after maintaining Band 1 assets, Band 2 assets receive a lesser percentage of remaining funds. Assets in the lower priority bands may only receive preventive maintenance for the most critical components or may require special projects or partner funding to maintain them. For additional information about optimizer bands and how park managers use them to make decisions about the efficient use of funding for maintenance and restoration activities at the park, Click Here.

## Energy Consumption

web

The production of energy to heat, cool, and illuminate buildings and to operate water utility systems is one of the largest contributors to greenhouse gas emissions in the United States. The National Park Service is committed to improving facility energy performance and increasing its reliance on renewable energy sources. The National Park Service has a goal to reduce Servicewide building energy consumption per square foot of building space by 35% by 2016 from the baseline set in 2003 (NPS Green Parks Plan 2012).

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Energy Consumption** | BTUs per gross square footage of buildings |  | To reduce greenhouse gas emissions and save energy, the park recently installed a 60KW solar array atop the Visitor Center and installed energy-efficient lighting. Energy usage (BTUs per gross square footage of buildings) at the park in 2012 was 64% lower than the average for the previous 3 years (Source: NPS Annual Energy Report). |




## Water Consumption

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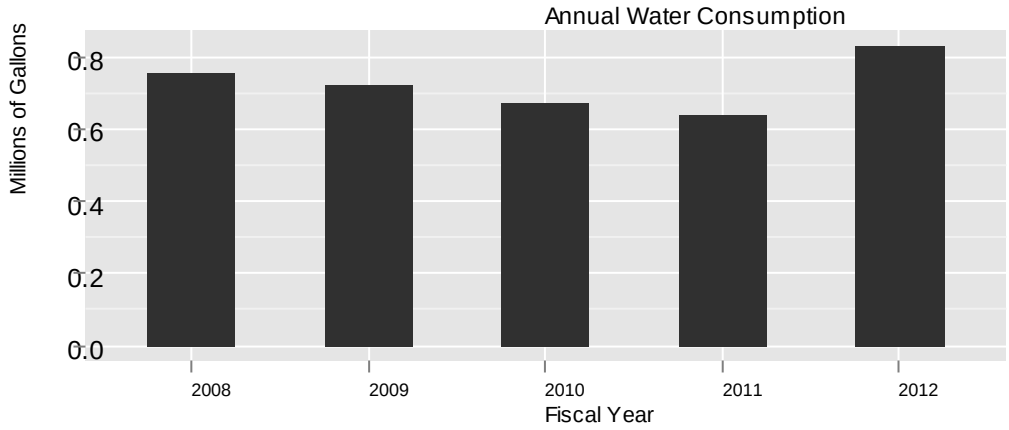
The national and global supply of fresh water has diminished in recent decades, and this trend is likely to continue due to drought and other climatic changes. To contribute to the responsible use of freshwater supplies, encourage groundwater recharge, and protect water quality, the National Park Service is improving its efforts to conserve water, reuse gray water, and capture rainwater, and has set a goal to reduce non-irrigation potable water use intensity by 30% by 2020 from the baseline set in 2007 (NPS Green Parks Plan 2012).

| Indicators of Condition | Specific Measures | Condition Status/Trend | Rationale |
|---|---|---|---|
| **Water Consumption** | Millions of gallons | | Water consumption at the park in 2012 was 19.6% higher than the 4-year average for 2008–2011 (Source: NPS Annual Energy Report). |




# Chapter 3. Summary of Key Stewardship Activities and Accomplishments

## Activities and Accomplishments

The list below provides examples of stewardship activities and accomplishments by park staff and partners to maintain or improve the condition of priority park resources and values for this and future generations:

**Natural Resources**

- Completion of basic natural resource inventories and initiation of long-term monitoring of a subset of the park's natural resources by the Southeast Coast Inventory and Monitoring Network (SECN).
- Removal of exotic and invasive plants by the NPS Exotic Plant Management Team, park staff, Trail Club, and other partners.
- Eradication of 5 acres of invasive bamboo by the Kennesaw Mountain Trail Club.
- Annual garlic mustard pulls to help control this invasive species.
- Completion of a (draft) Natural Resource Condition Assessment to evaluate and summarize existing natural resource data for the park.
- Designation of the park as the first Important Bird Area by the Audubon Society.

**Cultural Resources**

- Ongoing maintenance of the Kolb Farm House historical site.
- Plan for managing the Civil War earthworks was completed in FY12.
- Funding received to clean the Illinois Monument in FY14.
- A survey of the archival collections will be conducted in FY13.
- Archeological testing was conducted along a proposed trail route through the park.
- Study completed to determine how African Americans perceive the Civil War battlefield in FY10.
- Increased accessibility to the park museum collection by Americans with Disabilities, including adding touch stations, a sign language interpreter to videos, and a device that gives details for visually impaired users.

**Visitor Experience**

- New park orientation film was finalized in September 2013 to replace the 20-year-old film. It is in high definition.
- The park has completed a Sign Plan that was implemented in FY13, to improve the existing highway and road signs in addition to the trail signs.
- Cell phone audio tour developed that allows visitors to learn about park locations and features using their cell phones.
- Trail Club program has been expanded to include Trail Ambassadors to assist visitors with navigation and use of the park.
- Two new parking lots were established to increase opportunities for park use and appreciation, which increased parking to 400 additional spaces.
- New hybrid shuttle bus provided to take visitors to the top of Kennesaw Mountain.
- "Traveling trunk" exhibit developed for students with visual and hearing impairments.
- Signage installed in 2012 along the environmental trail to improve interpretation.
- Visitor Center displays were created to link park history with recreational use.
- Grant received by the park to help bring urban youth and underserved middle school students to the park to learn about the significance of the Atlanta Campaign and the Civil War while improving park trails.
- Ticket to Ride Program allows the park to host about 400 students at the park. It provides transportation for underserved children to visit the park and learn about the significance of the Battle of Kennesaw Mountain.

**Park Infrastructure**

- To reduce greenhouse gas emissions and to save energy, the park recently installed a 60KW solar array atop the Visitor Center, replaced the roofing, and installed insulation.
- Reduced waste in the park in part by removing trash cans from parking areas. This has resulted in a significant decrease in the park's contribution to landfill, and associated carbon footprint related to hauling and processing. Other benefits include reducing pests, removing an unnatural food source for wildlife, and reducing litter.
- Exotic/Invasive plants removal and control throughout the park was accomplished through collaboration with the NPS Exotic Plant Management Team (EPMT), Park employees, Volunteers and the Kennesaw Mountain trail club.
- Construction of new waste water system for the Maintenance, Administration, and the Visitor Center.
- Replaced wooden foot bridge at Ward Creek with sustainable fiberglass bridge.
- Replaced wooden foot bridge at Noses Creek with sustainable concrete/steel bridge (Emergency Vehicle Rated).
- To eliminate roadside parking and improve visitor safety, installed new parking lots at Old Highway 41, and expanded and improved the parking areas at Cheatham Hill Road and Burnt Hickory Road.
- Emergency weather-related tree removal throughout the park.
- New Cannon Monument installed at the main entrance to the Visitor Center parking area. This task was accomplished from Park employees, volunteers, and the Kennesaw Mountain trail club.
- Completed Field Mortar Analysis and repairs on the Georgia Overlook.
- Beautification, landscaping at the Visitor Center grounds.
- Upgraded benches with sustainable recycled materials throughout the park, and installed new tables in picnic area that were constructed from recycled materials.
- Upgraded tile in Visitor Center restrooms for improved aesthetics and lower maintenance.
- Installed security system in historic Kolb Farm home.

- Remodeled Mission 66 house for office space and installed energy saving appliances and fixtures.
- Returned non-historical fields to native trees and vegetation.
- Installed solar-powered gates throughout the park.
- Installed accessibility water-saving drinking fountains.
- Established recycling program within the park.
- Established and managed pesticide program.
- Managed and supervised the community work service program at the park.
- Installed and repaired signage throughout the park.
- Road repair, reseal and re-striping park service roads, parking areas and drives.
- Installed new walking bridge at Visitor Center picnic area. Eagle Scout projects.
- Repaired/replaced fencing throughout the park.

# Chapter 4. Key Issues and Challenges for Consideration in Management Planning

Kennesaw Mountain National Battlefield Park preserves a vast landscape upon which occurred a strategically consequential event in perhaps the most tragic and transformational period in American history. The park has become one of the most important recreational green spaces in a major US metropolitan area, receiving more than 1.9 million visitors in 2012. It is the most visited Civil War Park in the NPS system. Managers have a continuing challenge to balance the multiple goals of preserving these outstanding cultural and natural resources while providing for increasing demands for outdoor recreation opportunities from a growing metropolitan area population. Of the utmost importance for all park users is safety.

Access to the top of Kennesaw Mountain is considered a "mission critical" element of the park interpretive experience, helping visitors understand the strategic importance of Kennesaw Mountain during the Atlanta Campaign of the Civil War. The mountain road was constructed for vehicular access. It is steep (12% grade), winding (9 blind curves), and narrow (10-feet. wide driving lanes), with little or no shoulder. The foot trail to the top of the mountain is steep and rocky, and is not handicap or stroller accessible. The 1.5 mile road has become a popular exercise and training location for walkers, joggers, and bicyclists, creating significant safety concerns. These activities have increased dramatically within the past ten years, amplifying safety issues and generating substantial conflicts between different user groups. Pedestrians, often 2–3 abreast and pushing baby strollers, walking dogs, wearing headphones, and some walking backwards, travel in the traffic lanes which interferes with approaching vehicles, therefore forcing vehicles into the oncoming traffic lane. Bird enthusiasts regularly gather in groups of 20–50 on the mountain road obstruct traffic lanes, with binoculars focused skyward unaware of approaching traffic. Bicyclists often ride two or more abreast going uphill, requiring vehicles to pass in the oncoming traffic lane. Bicyclists regularly exceed the 25 mph speed limit on their descent, reaching speeds in excess of 40–50 mph and creating a hazard for themselves, pedestrians, and motorists. An Engineering Study prepared in 2003 by the Federal Highway Administration identified major safety concerns with the mixed usage of the Kennesaw Mountain Road. This was echoed by a 2004 analysis by Federal transportation planners who found it imperative that safe alternatives for pedestrians and bicycles be developed. Many mountain road users recognize these dangers, and have shared their concerns regarding "near misses" between all three user groups.

The park is an island of green surrounded by suburban development, consisting of 38 homeowner associations. The park roadways have become a commuter traffic thoroughfare. The majority of this traffic is cut-through or non-park traffic as confirmed by the high number of non-recreational visits (11 million non-recreational to 1.9 million recreational). The park estimates that 97,000 cars pass through the park per day. Virtually all park roads are already operating beyond capacity and affecting roadway safety. The park experiences about 200 accidents per year including several fatalities. The level of service on many roads is D, E, and F. Projections show a worsening situation representing gridlock (LOS F) in 2030. Over the years, park resources and the visitor experience have been progressively fragmented and degraded by the growing traffic volumes and its associate affects. Visitors are affected by the poor capacity and safety on park roads, the fragmented resource, and the degraded visitor experience. To tour the park's significant sites, visitors must leave and return to the park several times while traveling on a series of congested park, state, and county roads. This circuitous, congested routing distracts from the desired visitor experience, fragments the interpretive story, and also impacts law enforcement and maintenance capabilities. There is pressure to expand the park-owned roadways to better accommodate the heavy volume of commuter traffic.

Park trails extend to either side of several busy public road corridors. Because the park maintains trails that extend to either side of at least three busy road corridors, the park staff has been adding traffic signals and traffic calming elements as possible. Currently these are used to link trails, parking lots and other park features. Crossings of most concern presently include two along Burnt Hickory Road, and one along Dallas Road. Cobb County Department of Transportation assisted park staff with the crossing at Cheatham Hill

Road by installing a flashing yellow light that can be activated by the park visitor. The park plans to add more traffic calming and pedestrian safety features such as flashing signs to improve safety at pedestrian crosswalks.

Staffing is very limited for the size of the park, with only fourteen full time employees, one term employee, and four seasonal employees. The National Park Service staff to visitor ratio average is 1:18,500, Civil War Battlefields average 1:18,245, and Kennesaw Mountain National Battlefield Park is one staff person to 126,000 visitors. The staff maximizes visitor services and operations through park volunteers and court-ordered community service workers. The latter assist with general maintenance while the park volunteers help maintain the 20 miles of park trails, provide roving interpretation, conduct living history programs and demonstrations, conduct research, staff the visitor center front desk, and remove exotic and invasive plants. Although the staff is very creative when it comes to providing a quality visitor experience, the fact remains that it is rare to see a uniformed employee outside in the resource unless it has to do with a visitor protection issue. The development of a Friends group could provide funding to increase seasonal and term staff levels, thus allowing the park to conduct more interpretive programs. Through interpretation, the recreational visitor can be better educated on the importance and significance of the park, therefore becoming better stewards of the park's resources.

Management strategies are needed for recent and anticipated land acquisitions, including the Hensley property, and the soon to be acquired Hays and Leavell properties. The possible addition of 58 more acres will protect and preserve the entrenchments, rifle pits and cannon placements for the 1864 battle. With a small staff, there remains the challenge of how to best interpret, manage and protect the additional land without further impact to the staff. At present, the park relies on the support of staff from the National Park Service Southeast Region for expertise with natural and cultural resources, as these are both areas of great limitation amongst the current staff. With other parks in the Southeast Region having similar needs for expertise and support from specialists in the regional office, it is becoming increasingly difficult for the park to get the support it needs.

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See the State of the Park Report for the Park website for a more complete list of references to documents and data sets upon which the assessments in this State of the Park report are based. References for several of the key documents cited in this report are as follows:


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**See Also:**

Collection of Natural Resource-Related References

Collection of Cultural Resource-Related References

Collection of Visitor Experience-Related References

# Glossary

See the State of the Parks home page for a link to a complete glossary of terms used in State of the Park reports. Definitions of key terms used in this report are as follows:

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| Americans with Disabilities Act (ADA) | Law enacted by the federal government that includes provisions to remove barriers that limit a disabled person's ability to engage in normal daily activity in the physical, public environment. |
| Archeological Sites Management Information System (ASMIS) | The National Park Service's standardized database for the basic registration and management of park prehistoric and historical archeological resources. ASMIS site records contain data on condition, threats and disturbances, site location, date of site discovery and documentation, description, proposed treatments, and management actions for known park archeological sites. It serves as a tool to support improved archeological resources preservation, protection, planning, and decision-making by parks, centers, regional offices, and the national program offices. |

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| Baseline Documentation | Baseline documentation records the physical condition of a structure, object, or landscape at a specific point in time. A baseline provides a starting point against which future changes can be measured. |
| Carbon Footprint | Carbon footprint is generally defined as the total set of greenhouse gas emissions caused by an organization, event, product or person. |
| Climate Friendly Park | The NPS Climate Friendly Park designation requires meeting three milestones: completing an application; completing a comprehensive greenhouse gas (GHG) inventory; and completing a Climate Action Plan, which is the actions, policies, programs, and measures a park will put into place to reduce its GHG emissions. |
| Cultural Landscape Inventory (CLI) | A Cultural Landscapes Inventory describes historically significant landscapes within a park. The inventory identifies and documents each landscape's location, size, physical development, condition, characteristics, and features, as well as other information useful to park management. |
| Curation | National parks are the stewards of numerous types of objects, field notes, publications, maps, artifacts, photographs, and more. The assemblage of these materials comprises a museum collection. Curation is the process of managing, preserving, and safeguarding a collection according to professional museum and archival practices. |
| Exotic Plant Management Team (EPMT) | One of the ways the NPS is combating invasive plants is through the Exotic Plant Management Program. The program supports 16 Exotic Plant Management Teams working in over 225 park units. EPMTs are led by individuals with specialized knowledge and experience in invasive plant management and control. Each field-based team operates over a wide geographic area and serves multiple parks. |
| Facility Condition Index (FCI) | FCI is the cost of repairing an asset (e.g., a building, road, bridge, or trail) divided by the cost of replacing it. The lower the FCI number, the better the condition of the resource. |
| Foundation Document | A park Foundation Document summarizes a park's purpose, significance, resources and values, primary interpretive themes, and special mandates. The document identifies a park's unique characteristics and what is most important about a park. The Foundation Document is fundamental to guiding park management and is an important component of a park's General Management Plan. |
| Fundamental and Other Important Resources and Values | Fundamental resources and values are the particular systems, processes, experiences, scenery, sounds, and other features that are key to achieving the park's purposes and maintaining its significance. Other important resources and values are those attributes that are determined to be particularly important to park management and planning, although they are not central to the park's purpose and significance. These priority resources are identified in the Park Foundation Document and/or General Management Plan. The short-cut name that will be used for this will be Priority Resources. |
| Historic Integrity | Historic Integrity is the assemblage of physical values of a site, building, structure or object and is a key element in assessing historical value and significance. The assessment of integrity is required to determine the eligibility of a property for listing in the National Register. |
| Indicator of Condition | A selected subset of components or elements of a Priority Resource that are particularly "information rich" and that represent or "indicate" the overall condition of the Priority Resource. There may be one or several Indicators of Condition for a particular Priority Resource. |
| Interpretation | Interpretation is the explanation of the major features and significance of a park to visitors. Interpretation can include field trips, presentations, exhibits, and publications, as well as informal conversations with park visitors. A key feature of successful interpretation is allowing a person to form his or her own personal connection with the meaning and significance inherent in a resource. |

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| Invasive Species | Invasive species are non-indigenous (or non-native) plants or animals that can spread widely and cause harm to an area, habitat or bioregion. Invasive species can dominate a region or habitat, out-compete native or beneficial species, and threaten biological diversity. |
| List of Classified Structures (LCS) | LCS is an inventory system that records and tracks the condition of the approximately 27,000 historic structures listed in the National Register of Historic Places that are the responsibility of NPS. |
| Museum Collection | NPS is the steward of the largest network of museums in the United States. NPS museum collections document American, tribal, and ethnic histories; park cultural and natural resources; park histories; and other aspects of human experience. Collections are managed by professionally-trained NPS staff, who ensure long-term maintenance of collections in specialized facilities. |
| Natural Resource Condition Assessment (NRCA) | A synthesis of existing scientific data and knowledge, from multiple sources, that helps answer the question: what are current conditions of important park natural resources? NRCAs provide a mix of new insights and useful scientific data about current park resource conditions and factors influencing those conditions. NRCAs have practical value to park managers and help them conduct formal planning and develop strategies on how to best protect or restore park resources. |
| Priority Resource or Value | This term refers to the Fundamental and Other Important Resources and Values of a park. These can include natural, cultural, and historic resources as well as opportunities for learning, discovery and enjoyment. Priority Resources or Values include features that have been identified in park Foundation Documents, as well as other park assets or values that have been developed or recognized over the course of park operations. Priority Resources or Values warrant primary consideration during park planning and management because they are critical to a park's purpose and significance. |
| Project Management Information System (PMIS) | A servicewide intranet application within the National Park Service to manage information about requests for project funding. It enables parks and NPS offices to submit project proposals to be reviewed, approved and prioritized at park units, regional directorates, and the Washington Office. |
| Resource Management | The term "resources" in NPS encompasses the many natural, cultural, historical, or sociological features and assets associated with parks. Resource management includes the knowledge, understanding, and long-term stewardship and preservation of these resources. |
| Southeast Coast Network (SECN) | One of 32 I&M networks established as part of the NPS Inventory and Monitoring Program. The Southeast Coast Network comprises 20 parks in Alabama, Florida, Georgia, North Carolina, and South Carolina. |
| Specific Measure of Condition | One or more specific measurements used to quantify or qualitatively evaluate the condition of an Indicator at a particular place and time. There may be one or more Specific Measures of Condition for each Indicator of Condition. |